THE BBS LIST

This month *Boardwatch Magazine* presents a list of 205 bulletin boards/on-line services available in area code 303. See page 24. Our national selection lists 106 systems from across the country we think you'll find useful beginning on page 22. Corrections may be addressed via the Denver PC Boardwatch Fidonet Echomail Conference, or by Fidonet Mail addressed to **JACK RICKARD** via Net 104 Node 555 at (303)973-4222.

TELEBITS

XYWRITE AMNESTY PROGRAM

XyQuest Incorporated of Bellerica Massachusetts has announced a somewhat odd amnesty program covering their popular **XyWrite** word processing package. The program carries a list price of $495 but following the usual industry practice of discounting the program is widely available via mail order at about $225. During **August 1989,** the company is offering an unusual amnesty program to those who have pirated unauthorized copies of the program. Call in and confess, and they'll send you the current latest version for $125.

The XyWrite program is endlessly extensible, deals with files of unlimited size, and actually grew out of a typesetter preprocessor program. XyQuest Inc. was launched in 1982 by John Hild and Dave Erickson to bring the XyWrite (pronounced ZIE - WRITE) word processor to market. The two entrepreneurs had previously worked for a company named **Atex** which produced a typesetting program very popular in the newspaper industry. Xy-Write was essentially designed to emu-late the command driven interface used by the Atex editor module. XyWrite has for some time been the darling of professional writers, though its difficult to learn syntax has not made it a favorite among casual word processor users.

XyQuest has introduced a rather distinctive anti-piracy program. Essentially anyone in possession of an unauthorized copy of any XyWrite version, can mail in the bootleg program diskettes with their name, address, and telephone number, along with $125, and XyQuest will send them a registered copy of **XyWrite verions III Plus,** the latest release, complete with reference manual, keyboard templates, etc. The tutorial program will not be included since it is assumed that the participating pirate knows the basics of program use by now.

Anyone participating will then be fully eligible for future upgrades and support just as any other XyWrite registered user.

According to spokesman Jeff Clark, XyQuest has launched th program for two primary reasons. First, they hope to bring unauthorized users "into the fold" as loyal XyQuest customers. But the second and most important reason seems to be an effort to do something in a positive way to focus public attention on the problem of software piracy. "We've tried the negative approach," claimed Clark. "Lawsuits against pirates have largely been successful as to court damage awards, but our research shows they've not been completely effecitve in halting piracy. This amnesty program is a positive action we can take to focus public attention on the problem."

To participate in the program: send name, mailing address, unauthorized diskettes, and $125 to XyQuest Inc., ATTN: Order Department, 44 Manning Road, Billerica MA 01821; (508)671-0888. The program ends August 31, 1989. We reported in our May issue the excellent XyWrite support BBS the company maintains at (508)667-5669.

TYMNET SOLD

McDonnell Douglas has announced the sale of its **TYMNET** division to British Telecom of Great Britain for $335 million dollars. The San Jose operation employs nearly 1500 people.

NEWSBYTES JOINS COMPUSERVE

One of the oldest online publications was started by Wendy Woods of San Francisco on **THE SOURCE.** The publication came to life in May of 1983 as part of THE SOURCE's user publishing program. *Newsbytes* developed a following on THE SOURCE and enjoyed over six years online. With the sale of THE SOURCE to Compuserve in July 1989 and its subsequent shutdown on August 1, Newsbytes was effectively without a home.

As a result, *Newsbytes* quickly found a haven at competitor GEnie, run by General Electric Information Services. For GEnie users, the command **M316** at any prompt will take you directly to the *Newsbytes* area. Additionally, as of the first of August, Newsbytes did reach an agreement with Compuserve and will appear on that service as well. Compuserve subscribers can reach the service by entering **GO NEWSBYTES** at any prompt.

MICROLINK B
Multiline BBS (303)-972-9600
DESIGNED AND OPERATED FOR THE SERIOUS BBS USER

WHAT IS MICROLINK B?

Microlink B is the largest electronic Bulletin Board System (BBS) in the area, specializing in files and message services for the IBM-PC, XT, AT and compatible systems.

Microlink B has been serving the BBSing community since 1985 with quality public domain and shareware software, as well as interesting and informative message areas covering a variety of topics.

FILES, FILES AND MORE FILES

Your membership to Microlink B gives you immediate access to thousands and thousands of files that you can download directly to your computer. There are presently over 31,000 individual files available, and we are continuously expanding our collection. You can have everything from games to statistical calculation packages, database programs to personal finance managers, programmer's aids to computer communications utilities. Put simply, we have one of the most extensive software collections for the IBM-PC and compatibles in the country.

There's more... Microlink B maintains the complete 1,000 disk PC-SIG software library available on-line for our members. We think you'll agree that the PC-SIG library is one of the most comprehensive software collections available for the PC.

We do not provide software for the Mac, Amiga, or other non-IBM compatible machines. Why? Because we think it's better to put all our effort into providing you with the best possible software collection for your IBM-PC or compatible system.

TALK, TALK, TALK

We do messages too. The Microlink B message base is connected to the world via the FidoNet public amateur network. We 'echo' many of our message areas to other FidoNet systems in the area, across the country, and around the world. This means you can ask a question on Microlink B, and receive answers from experts all over the world.

We have message bases covering a variety of interesting topics from programming and technical issues to law, from aviation to using Lotus-123. And, yes, we do offer private E-MAIL message areas where you can leave confidential messages and files for other Microlink B members.

Microlink B also offers USA Today's Decisionline, a computerized version of the popular USA Today newspaper. Decisionline is updated early every weekday morning.

WHAT YOU NEED

To access Microlink B, you'll need an IBM-PC or compatible computer and a modem capable of operating at 1200, 2400 or 9600(HST) baud, as well as one of the many communications software packages that are freely available.

TAKE A TEST DRIVE TODAY

You can call Microlink B anytime to take a test drive. Set your communications program for 8 data bits, no parity and one stop bit (refer to instructions for your modem or communications software). Dial Microlink B at (303)-972-9600. Microlink B will ask for your full name, and then guide you along the way with easy to follow menus. You'll be able to tour the system, read messages, and look over our software collection.

BECOME A MICROLINK B MEMBER

For just $35.00 you can have full access to Microlink B for one full year, or pay just $25.00 for six months access. Use the handy order form below to become a Microlink B member. For your convenience, we now accept Visa and MasterCard.

Prices and specifications are subject to change without notice.

Newsbytes covers developments in personal/desktop computing with topical categories for Apple, IBM, and Unix products with more general topics covering telecommunications, computer use in business and in government, and product reviews. The staff is actually located in "bureaus" around the globe including Washington, Los Angeles, Atlanta, San Francisco, Toronto, London, Brussels, Tokyo, Sydney, and Malaysia.

One useful offering on *Newsbytes* is the **Boston Computer Exchange.** This service monitors actual sale prices of used personal computer equipment and posts a bluebook price for a variety of models. Individuals interested in buying, selling, or trading used computers find this most useful when trying to determine what an item is worth.

As of the first of the year, *Newsbytes* began a program to reach the smaller information services and now appears on several dozen electronic BBS and online information services around the U.S. and Canada as well. Systems "subscribe" to the service at rates determined by the number of callers their system receives with rates beginning as low as $25 monthly. For more information, contact the Boardwatch Information Service at **(303)973-4222** or call voice at **(303)973-6038.**

LAPTOP COMPUTER BATTERY ADVANCES

by Mark J. Medrud

Laptop computers are very popular for communicating text in the field, and they live and die on the performance of their batteries. Every laptop user knows the panic of hurriedly finishing his work while the low-battery light flashes. While all batteries must eventually "go flat", longer-lasting products are now on the horizon.

Nickel-Cadmium has been the chemistry of choice for rechargeable batteries in consumer goods for some time. It offers long service-life (**500** deep cycles is typical these days) and moderately high energy density. It delivers **1.2** volts, which is close enough to the **1.5** volts from an ordinary primary (non-rechargeable) cell to make it a direct replacement in most

cases. NiCads have gotten a bad rap for problems with "memory" and rapid self-discharge in the past, but the newer models are much better. The "memory" worked this way: If a cell suffered repeated partial discharge and heavy overcharge, the cell would act as though it had "gotten used to" this abuse and couldn't be fully discharged. In fact, the remainder of the charge was still available, but only at a lower voltage. Like a slow leak, self-discharge caused a fully charged battery to go dead after just a month or two of disuse. Modern NiCads can hold their charge for three to six months.

A battery is by definition a collection of individual cells, and laptop computer batteries are no exception. The cells are usually interconnected with thin strips of steel spot-welded to their terminals. For reasons of economy, standard cell sizes such as "C", "sub-C" and "AA" are common. The resulting battery is custom packaged; often in just a sleeve of heat-shrink tubing, but sometimes in a molded plastic box.

For quite a while, **1.8AH** (Ampere-Hours --a measure of capacity) was considered tops for a "C" size cell. Not too long ago, Matsushita upped the ante to **2.2AH** for their Panasonic brand high capacity "C" cells. Gates Energy Products should be the new leader. Though best known for their sealed lead-acid batteries, they recently announced a NiCad "C" cell claiming a capacity of **2.5AH**. We won't see production quantities for another two or three months, though.

The big news is Nickel-Hydride. Electro-chemists have been able to make NiHyd cells in laboratory experiments for several years, but they couldn't produce a practical version until very recently. The lure of this chemistry is that it has the same voltage and discharge characteristics of NiCad, without the memory problem and a potentially better than **60%** higher capacity. This makes it a "drop-in" replacement for NiCad --important from a marketing standpoint since myriad existing products won't need to be redesigned. A perfect case-in-point is Gates' "starved-electrolyte" lead-acid cells. They are in some ways superior to NiCads, but deliver 2 volts instead of

1.2 or 1.5 volts. This means that they can't be used as a direct replacement in most applications, and they have been much less popular as a result.

Ovonic Battery Company in Michigan is the first successful producer of NiHyd cells. They have been making a "C" cell for about a year. Samples cost **$10** each with the large quantity **OEM** (Original Equipment Manufacturer) price bottoming out at about **$6**. This is within striking range of NiCad on a dollars-per-AH basis. Varta Batterie AG in Germany has licensed Ovonic's technology, but won't have anything to sell until next year.

As might be expected, the Japanese have also been working feverishly on hydride chemistries for years, but only Matsushita has announced a product. They will have a "AA" size cell near the end of this year.

The Ovonic "C" cell delivers a **3.5AH** capacity. It has substantially better resistance to "over-discharge" (sometimes known as cell reversal) than NiCad. On the down side, it self-discharges more quickly. Sitting idle at room temperature, almost half of the charge is gone in a month. This shouldn't be too much of a problem, since laptops can stay connected to their chargers while at home base.

Put in terms of discharge time, if a computer drained its Panasonic NiCad battery in 4 hours, then the Gates version would last 4 1/2, and the Ovonic NiHyd would hold up for more than 6 hours.

Interestingly, if the laptop computing public could be convinced to shell out $8-$16 per disposable Alkaline battery (typically 10 cells per battery,) a whopping 12 hour life could be had. To extend this fantasy, an equivalently sized disposable Lithium battery would last more than 24 hours! Of course, the cost would be prohibitive --except maybe in executive-toy or aerospace terms.

Since Nickel-Hydride manufacturers are only just now starting production of the basic cells, no laptop computer maker or aftermarket battery packager is offering replacement batteries yet. Both are undoubtedly scrambling to be among the first to put their product on

store shelves. For readers interested in battery technology, here is a list of the manufacturers mentioned:

LAPTOP BATTERIES

Gates Energy Products
PO Box 861
Gainesville, Fl 32602
(904) 462-3911

Panasonic Industrial Co.
PO Box 1511
Secaucus, NJ 07094
(201) 348-5266

Ovonic Battery Company
1826 Northwood Drive
Troy, MI 48084
(313) 362-1750

Varta Batteries Inc.
300 Executive Boulevard
Elmsford, NY 10523
(914) 592-2500

HP LASERJET II PRINTER FAX

The use of facsimile machines has been somewhat phenomenal and there are currently over two million of the devices online. Since they consist primarily of a scanner, modem, and printer, the obvious question is why doesn't someone make one that can be used by a PC as a scanner, printer, or modem as well as a facsimile machine. Rumors of a $11,000 Canon machine are not encouraging. You can buy a scanner for $1000, A laser printer for $1750, a 9600 bps modem for $750, and a facsimile machine for $1000. Who would pay $11,000?.

The facsimile machines themselves printout received facsimiles on a pathetic thermal paper that is expensive, ugly, not very durable, and would be considered unacceptable on any other device.

Telautograph has come up with a device to deal with this most obvious shortcoming. Their **Omnifax PPI** connects between an ordinary telephone jack and the parallel port of an HP

Laserjet II printer or other **Canon LBP8-II** based laser printer. The device features a one Megabyte, **60** page buffer and can receive **CCITT Group III 9600** bps facsimile transmissions and route them to the laserjet printer. The device is priced at $1395. Telautograph Corporation, 8700 Bellanca Ave., Los Angeles, CA 90045; (800)221-8330.

CD-ROM DRIVE ALSO PLAYS MUSIC

Chinon America has introduced a fairly reasonably priced **$695 CD-ROM** drive unit for use with PCs. The unit can read any High-Sierra format **CD-ROM** and connects to the computer using the Small Computer Systems Interface (SCSI - commonly pronounced "scuzzy") port.

Most notably, the model **CDS-430** can also play your favorit audio compact disks. When you're not busy reading data, pop in your favorite Springsteen CD and do your keyboard work to the sound of the Boss. The unit is **13 X 11 X 3** inches and requires Microsoft CD-ROM extensions software ($150). Chinon America, Inc., 660 Maple Ave., Torrance, CA 90503; (213)533-0274

DOS TIP

Often it is useful to list all subdirectories within a directory without listing all the files as well. To list subdirectories only enter DIR *. and all subdirectories and files with no extensions will display
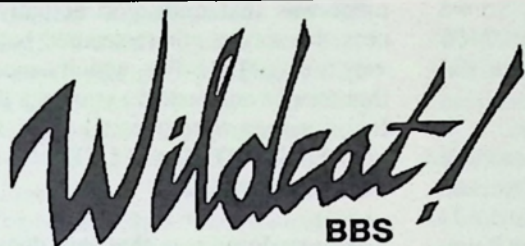
LONG DISTANCE PRICEWAR DEVELOPS

A total of 265 billion minutes of long distance calls were made in America during 1988 - up 46% from the 182 billion made in 1984, the year of the breakup of the Bell telephone system. During the same period, long distance rates dropped 40%. This $50 billion industry is shared by AT&T, MCI, Sprint, and several hundred lesser luminaries. Although AT&T continues to hold 68% of the total market, a virtual long distance price war has broken out to the benefit of the consumer.

This past July 1, a new regulatory mechanism went into place widely known as price caps. Essentially, it limits the actual rate charged for long distance calls to the current rate plus a factor for inflation. In an era of 10% average annual price cuts, this is nonsense. But it does eliminate the 12.5% rate of return regulation that was also largely nonsense and had the effect of encouraging spendthrift investment by AT&T as the only method for increasing profits. The new regulatory mechanism essentially deregulates long distance pricing. But the effect should be further cuts in long distance rates rather than increases.

MCI wasted no time. To counter AT&T's popular **Reach Out America** plan, they introduced their **Premier** calling plan during June. Similar to Reach Out America, Premier goes one better by dropping their evening rates from **7:00 PM** to **11:00 PM** to match the lower night time rates in effect from **11:00 PM** to **7:00 AM**. The net result is a boon to consumers who can now get the lower nigh time rates from **7:00 PM** to **7:00 AM**.

As of **August 1**, Sprint jumps into the fray with their Sprint Plus program that cuts evening rates by **25.6%** - approximately matching MCI's program but starting two hours earlier at **5:00 PM**. Additionally, they're dropping the monthly minimum from $15 down to $8 to match AT&T and MCI's program. And, customers who change to Sprint before **October 23** will receive a $25 credit on their **January 1990** bills. Sprint estimates that 45% of all residential calling occurs between **5:00 PM** and **11:00 PM**. Early returns indicate that the MCI program was working and residential customers were changing carriers to gain the new evening rates. With Sprint's move, AT&T will virtually be forced to follow suit.

The current year advertising expenditures are frightening with AT&T spending $500 million, MCI $150 million, and Sprint $120 million. If we don't all wind up telling each other through TV how cheaply we can talk to each other by telephone, prices should continue to drop dramatically.

AT&T LIKELY TO BE WORLDS LARGEST BBS

Judge Harold Greene has ruled that there was no overriding reason to believe that AT&T would unduly dominate the videotext field, and so the August 24, 1989 expiration of the ban on AT&T's entrance into information services will be allowed to expire. Under the consent decree entered seven years ago, AT&T was barred from information services for a period of seven years. At that end of that period, if a substantial presence by other companies existed in the field, the ban would expire.

Most industry analysts expect AT&T to waste no time in putting up an online information service, probably involving white page directory or yellow pages services. A national white pages telephone directory service could boost the use of modems and data communications in general virtually overnight.

What form the AT&T service might take is strictly conjecture at this point. However, imagine the ability to search by modem for every James Smith with a directory listing in the United States and retrieve his telephone number and street address. This would be a big boon to those trying to locate lost acquaintances or perform genealogical research. Alternately, the ability to locate every mink mitten importer in the country might be of interest...to someone.

Rumor has it that AT&T has entered into discussions with Compuserve, Dow Jones News, and oddly Nintendo. It seems that there are some 15 million Nintendo games out there and the company apparently built-in a type of secret telephone communications capability. Nintendo game owners may be able to logon to a national network soon.

FRENCH TELETEL SYSTEM STRUGGLES

Communications Week Magazine reports that the highly touted French Teletel videotext service lost $742 million in 1988 and based on the 1988 figures, the company will still be losing about $575 million in 1995. The service is subsidized by France Telecom International and Minitel terminals are provided to French citizens on a free loan basis.

We had slammed the U.S. arm of this service, Minitel Services Company (MSC), pretty roundly in a recent issue of *Boardwatch* based on an utterly labyrinthine command structure, high price, and low utility.

Joseph Mazzeo of MSC contacted us about the review and presented a pretty attractive vision of the future primarily centered around the information service providers. Mr. Mazzeo is essentially lining up contracts with Regional Bell Operating Companies on the one hand and Information Providers on the other in order to garner a cut out of the middle somewhere. He supports Southwestern Bell's claim of 10,000 users on their SourceLine gateway and claims he has several Information Providers in his stable clearing over $10,000 per month now on a total audience of 35,000 callers. He sees a future network spanning the nation where he can hook up Information Providers at very

reasonable rates and deliver them an audience of as many as **85,000** callers by early next year.

It's a heady vision, and a good one. We share his view of a future of **10,000** on-line information services operating profitably in the U.S. His concept of tying **RBOC** gateways into Information Providers is fantastic. But after re-examining the issue, we must reiterate once again that it will not be on a Minitel or Minitel-like system. **RBOCs**, **MSC**, and whoever else has an ear to hear, let them hear. It just ain't gonna happen in this life - not with that software and not with that presentation paradigm - period.

This is a tough stand to take. The **RBOC's** are embracing the Minitel Software. An industry of software and hardware providers are springing up. And an enormous market of would be information providers are lining up to "join the revolution" as evidenced by the recent response we had to an article on the subject in *Investor's Daily*. One vendor is selling a Compaq computer, **X.25** card, and software for **$24,000** and can't answer the telephone fast enough. He should do well since this is about $7000 worth of merchandise total that he's pushing. We may well be turning our backs on a segment that could support several magazines by itself. But remember where you heard it first: this mess is headed for bad news by the truckload and it is going to take a lot of good people with it.

After our conversation with Mr. Mazzeo, we decided that perhaps the frustrations of summer heat, quickly approaching deadlines, cranky equipment, and so forth must have colored our earlier review. One fascinating element we had wanted to explore concerning **MSC** was the actual connection to the French services. In fact, just accessing the French telephone directory was a bit of a racey idea so we decided to try again. We pulled the Minitel software, installed it on the hard disk and tried to dial the local Denver number at **(303)893-3808** at 2400 bps using our relatively new **USR HST Dual Standard** modem. No go. It tried at 1200 for some reason but never did make the connection. We simply were not going to wrestle with the HST Non-

Volatile RAM settings this day. So we switched in a little SupraModem 2400 we've had some good luck with and did get a connection.

The service requires you to enter a credit card number, expiration date, and your mother's maiden name. It wouldn't take ours and it appears it was because we had opened an account using that card earlier. Since the existing caller ID and user password had previously been conscientiously filed in the pile files, there was about as much likelyhood of getting to France by finding them as there was of me jumping up, flapping my chubby little arms and flying to France naked with a rose in my mouth.

The only error message was **UNABLE TO CONTINUE REGISTRATION PLEASE CALL (914)694-6266**. We did. No answer.

We tried a different credit card, and somebody else's mother's maiden name and it did finally let us go through the logon procedure. We were informed through a series of screens that the French services were **$0.30** per minute. We also learned that they were **$0.33**. And we further learned that they were **$0.35**. Oh and maybe some were **$0.17**.

The system operates through a series of menus with one bizarre twist we noticed in our previous review but didn't realize was system wide - you can't get out of anything without starting all over at the beginning. The menus are one way ports to more one way ports. They are the electronic equivalent of the Roach Hotel, you can check in but you can't check out. We tried this with USA Today, several French services, and even a couple of fairly innocuous looking directories. All your function keys have been remapped to the Minitel functions like **NEXT, PREVIOUS, INDEX, CANCEL, GUIDE, NEXT, SEND**, and so forth. However, not all keys work at any one time, and there is no way to know at any one time which ones are working and which are not. Sometimes **GUIDE** gets you some help information and sometimes not. Sometimes **INDEX** will take you back a screen or two, sometimes it causes the rather more stoic response of not squat happening. But the one consistent ele-

ment was that once you actually accessed a service, there seemed but one way out - **SHIFT-F2** - which cancelled that service and brought you back to the logon screen where you had to enter your **PASSWORD** and **USER ID** once more to try again.

I am utterly certain that this does not operate this way. I know it both in my heart and in my mind. No one, not even a Frenchman, would design anything this idiotic. But with an IQ in excess of 160, nine years of dialing literally thousands of online services around the nation and the world, and sixteen years of aerospace and electronics work, I simply have to come clean. I can't figure out how to get this thing to work. It is beyond my powers of comprehension. And truly, both MSC and virtually all of the Bell Operating Companies tout this as **THE ONLY** interface simple enough to sell to a general populace that has never had a modem in the house before. Call me crazy.

By repeating this loop down into services and then logging on again six or eight times, I did finally activate the French Fone Directory, which is actually simple enough to reach once you've gone through it. Enter **ED** to get there and as I understand it, it is priced at a fairly reasonable **$0.17** per minute. This isn't really bad considering the fact that you are reaching the telephone directory for another country a third of the way around the planet. I don't know that you are actually connected overseas, the database could be duplicated in Paragould Arkansas for all I would know but it was interesting. I did find two **Rickards** in Paris, Charles and Patrick. The service listed their street address and telephone. I'll look em up and drop em a rose next time I flap through.

In filling out the form to query the database, the prompts repeatedly referred to the **ERASE** key. Here's a news flash for you. No such key defined in software. There is a **CANCEL** key (**F2**) defined that works about as well but not quite. Nearly every screen referred to **ERASE** - I'm going to guess this is a problem.

MSC claims **10,000** French services and provides a little guidebook of the **1500** most popular (call **(800)822-MNET** for a copy). We found a likely service titled **CANITEL**. It is essentially an online magazine for dog lovers providing advice, news, tips, and so forth for dog breeders. We did locate the service, in the directory. The prompt said to press **SHIFT F8** or the numeric keypad plus key to get in if you were calling from a PC or a carriage return if you were calling from an Minitel terminal. We tried all of them and in various combinations. We never did get in. And consequently, we found nothing in the way of puppy recipes.

Again, I love the concept of a worldwide network. I'm enthralled by the concept of **RBOC** information gateways. I love Joe Mazzeo's vision of hooking up Information Providers to **RBOC** and all of them voting each other millionaires. But this is just not the way. Minitel is a ten-year-old technology that wasn't any good then and unlike Cognac, it has not improved with age.

For the curious, **Version 2.1** of the Minitel terminal emulation software for IBM and compatibles is now available as well as **Version 1.0** of the Minitel terminal emulation software for the Commodore C-64/C-128. You can obtain a copy by contacting Minitelnet, Inc., 1700 Broadway, 25th Floor, New York, NY 10019; (914)694-6266.

TINY NEW ZENITH LAPTOP

Zenith Data Systems was formed to bring the Heath/Zenith team into the world of desktop PCs. And they've done an absolutely pathetic job of it. Their desktop units are odd, kludgy devices just barely within the realm of compatible, overpriced, and without their selection by the armed forces for a year or two probably would have been abandoned even by Zenith.

Oddly, their laptop units have enjoyed precisely the opposite fortunes and the **Zenith SuperSport** has been reigning recently as one of the top selling laptops in the industry. It gets rave reviews in all the industry publications and in all ways is a success.

The company seems to have decided to go with the flow. Last month they introduced a new computer with some excitingly innovative features. Its titled a **MiniSport** and it is notably small. The unit is **12.5 X 9.8** inches, slightly over an inch thick when folded, and weighs a scant **6** pounds. It is ostensibly one of a new breed of "notebook-sized" computers. The NEC Ultralight broke this ground in the first real sense and a Japanese Dynabook seems to be causing some waves as well. But the Zenith entry should be taken into account.

The unit sports a reasonably usable keyboard, a backlit **80 X 25 LCD** screen, serial and parallel ports, and 1 MB of memory configured as **640 K** DOS plus a **384KB** ramdisk. It uses an 8 MHz 80C88-2 microprocessor. **DOS** and some Laplink-like file transfer software are held in an **832K ROM** chip. For disk access, the unit uses an amazingly tiny 2-inch floppy disk drive. The floppies have a **720 KB** capacity and cost a face slapping $99 for a box of ten. The media is ostensibly identical to that in use by some super exotic cameras/video units and the price might come down as they become more common.

Most notable was the very competitive price of the unit itself. The one megabyte **Model 1 MiniSport** makes the trip for $1999. Zenith may do well again. Zenith Data Systems, 1000 Milwaukee Ave., Glenview, IL 60025; (800)842-9000.

CALIFORNIA LAW ON CD-ROM

National Legal Databases Corporation of Tulsa Oklahoma is marketing a line of CD-ROM titles essentially aimed at the legal profession. One of their recent flagship products in their **LAWDISC** line is *California Civil Cases (1930s to present)*. The two disk set contains the complete text of all California court proceedings from 1935 until the present for $3700. Quarterly updates are available for $990 per year or monthly/quarterly updates for $1200 per year. National Legal Databases, 5319 South Lewis, Suite 110, Tulsa, OK 74105; (800)533-0159.

CROSSTALK DOES WINDOWS

Digital Communications Associates has announced a version of their popular **CROSSTALK** communications program operating under the Microsoft Windows environment. The Crosstalk for Windows package will carry a $195 price tag.

APPLE/MICROSOFT/HP LAWSUIT COMING UNRAVELED

Apple Computer filed suit last **March 17** in the US District Court for Northern California claiming that Microsoft's Windows program and Hewlett-Packard's New Wave program infringed on audio visual copyrights held by Apple. Microsoft claimed the works are covered under a **1985** license agreement that was specifically reached to avoid such suits.

Judge William Schwarzer agreed with Microsoft in a partial summary judgement delivered **July 25** that essentially threw out **179** of the **189** issues brought up in Apple's suit. The remaining ten issues deal primarily with the concept of "overlapping" windows on screen and with the ability to "move" icons about the screen. The remainder of the case deals with whether or not apple has a defendable copyright to those paradigms.

LOTUS INTROS 1-2-3 VERSION 2.2

Lotus Development introduced a new version of its popular 1-2-3 spreadsheet program that it terms version 2.2. This is odd since the company just recently introduced version 3.0 and you would think the leading spreadsheet developer would have a more lucid concept of arithmetic than that. Actually, version 3.0 requires the use of expanded memory and the new version 2.2 will operate in the more common DOS 640 KB. But like its bigger brother, it features "linkable" spreadsheets whereby the contents of a spreadsheet cell can be tied to a cell in another spreadsheet stored on disk in a separate file. Version 2.2 carries a $495 list price tag.

The company also introduced a new educational distribution program in cojunction with Douglas Stewart Com-

pany, and educational distributor to over 4500 college book stores. The program is notable in that students can purchase **Lotus 1-2-3 Version 3.0** for **$129** and the new **Lotus 1-2-3 version 2.2** for **$99**. Other Lotus products such as Magellan and Manuscript are available at similar discounts. Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02140; (800)367-6100.

RUMORS RUMORS

Apple Computer will very likely announce the birth of a hefty little portable Mac weighing in at the **12-15 pound** range with a proud pappa price tag of around **$5000**.

NeXT is reported to be working on a new desktop unit based on a Motorola **68040** microprocessor chip. Motorola insiders report that separate data and instruction busses on this chip make it a four ton screamer as far as microprocessors go.

Telenet has purchased about **1500 Microcom V.32** modems. They're beta testing in New York and Washington D.C. Nationwide access to services on Telenet via **9600 bps** link is just around the corner.

TELETRIVIA

The earth suffers from a bit of a wobble it seems. Known as the **Chandler Wobble**, the north pole wanders in a **37** foot circle on a seven year cycle. It's thought to be caused by atmospheric imbalances. Some sort of planetary gas pain?

According to consulting firm Frost & Sullivan, over **700,000** conference calls were made by American businesses during **1988** at an average cost of **$100** each.

Pacific Telesis currently reigns as the top cellular telephone vendor with **250,000** subscribers. Los Angeles is the top city for cellular with over **200,000** units spritzing around in BMW/Mercedes yupmobiles.

Southwestern Bell claims its new **SourceLine** gateway service drew **10,000** callers during two month trial period.

A mile of fiber optic strand weighs less than **3** ounces and can carry the equivalent data flow of 33 tons of copper wire.

Dow Jones has introduced a new market summary report service titled **Quick-Calls** operating on a **900** service at **(900)246-4444**.

Sandia National Laboratory in Albuquerque New Mexico has developed a **photovoltaic cell** with a heretofore unheard of efficiency of **20.3%**. They claim it could open the door to the solar powered home. Previous efficiencies of **14%** were common.

Who's voice do you hear in the AT&T recorded messages? Very likely Pat Trumble's. She's been recording AT&T messages for years.

IBM has begun production of **4** Megabit RAM memory chips in Sindelfingen West Germany.

GIGABYTE TAPE DRIVE

Jasmine Technologies has introduced an external tape backup unit capable of storing **1.27** Gigabytes of data on a single **DAT** tape cassette smaller than a conventional audio cassette. The unit is termed a Direct Digital Tape Drive and uses the new **DAT** technology. It operates as a SCSI device featuring a **1.74 Kbps** transfer rate and a maximum **40** second seek time. The high data density is accomplished with a **1900** track-per-inch format. The unit is priceds at **$6995**. Jasmine Technologies, Inc., 1740 Army Street, San Francisco, CA 94124; (415)282-1111.

POCKET ETHERNET ADAPTER

A fairly lucrative niche market appeared in the modem world over the past few years for cigarette package-sized modem units that plug directly into the serial port of the computer. These "pocket" modems are very portable, work well with laptop computers, and are generally quite a bit cheaper than the laptop internal modems. Migent's Pocket Modem and Touchbase System's WorldPort Modem did well in this market.

Now Xircom has introduced a similar pocket configuration Ethernet adapter to allow connection of a PC or laptop to Ethernet local area networks using either thick or thin coaxial cable. Drivers are available for **Novell Netware 2.0** and **2.1** with similar drivers for 3Comm's **3+** and **3+ Open** available by the end of the year. The unit connects to the parallel port of the PC. It's priced at **$695**. Xircom, 22231 Mulholland Highway, Suite 114, Woodland Hills, CA 91364; (818)884-8755.

FURLONGS PER FORTNIGHT

You often hear the term "furlongs per fortnight" as a somewhat tongue-in-cheek reference to a noticeably slow rate of speed. Just how fast is it in real terms? Mr. William Matheson of Friday Harbor, Washington recently wrote to *Byte Magazine* to provide his calculations showing the speed of light in furlongs per fortnight. A furlong is defined as **660** feet - equivalent to about **201.168** meters. Using a time constant of **1,209,600** seconds in a two-week fortnight, and the currently recognized speed of light as **299,792,458** meters per second, he calculates that light travels at a speed of **1,802,617,499,790** furlongs per fortnight.

While this pins down the speed of light with reference to the furlongs per fortnight scale, we were left still grappling for a solid mental image of how fast this was. We've never traveled at the speed of light and could find no one in our immediate circle who had, or who could recall the experience at all vividly - excluding out-of-body experiences. And we'd never traveled anywhere that took a full fortnight to reach, although a couple of all-day automobile trips with three kids under the age of five to provide navigation and supervisory assistance would probably provide a reasonably good simulation there.

But taking the more familiar speed of **25** miles-per-hour, we would calculate a metric equivalent of **40233.6** meters per hour. With **336** hours per fortnight, this looks like about **13,518,489** meters per fortnight. Recalling our **201.168** meters per furlong formula, we would have to say that 25 mph is about **67199.997** furlongs per fortnight. Say **67,200** furlongs

per fortnight equals 25 mph. Or you could say that a single furlong per fortnight equals about .000372 miles per hour.

386SX MOTHERBOARD FOR $395

Pioneer Computer of Freemont California has broached something of a price barrier with a 16 MHz 80386SX microprocessor-based motherboard they intend to market to Original Equipment Manufacturers and Value Added Resellers for a price of $395. This pricing is fairly common for ordinary 12 MHz 80286 motherboards but the 386 models have typically been making the trip for $800 to as high as $1500 per. The **Pioneer Vantage 386SX** model uses the **16 MHz SX** version of the popular Intel chip. Unlike the standard 80386 microprocessor which features a 32-bit data bus, the 80386SX features a 16-bit wide data path, making it more compatible with equipment designed for use with the previous 80286 microprocessor.

The motherboard can carry up to **8 MB** of **RAM** and features support of the Lotus/Intel/Microsoft (LIM) version 4.0 expanded memory standard. It will be boosted to 20 MHz as soon as Intel begins shipments of the 20 MHz 80386SX.

According to Patrick Lee, Vice President of Marketing and Product Development, the company also plans a full 32-bit implementation using a 20 MHz 80386 microprocessor to be available in late September at an **OEM** price of $550. He claims that the low price is due to design driven quality. It's not that the motherboard is inherently superior in operation, but because of the design they get a higher yield of good motherboards per **1000** produced than most manufacturers, giving them a price advantage. Pioneer Computer, 49066 Milmont Drive, Freemont, CA; (415)623-0808.

FAX/MODEM COMBINATION

Best Data Products Inc. introduced a somewhat interesting device recently. The **Smart One 4824SF** modem functions as a normal **2400 bps** modem, but it is switchable to a fax mode allowing

transmission of graphic files and **ASCII** text documents to **CCITT Group III** facsimile devices. This double duty wonder is made a triple threat by an attractive **$199** price tag. Best Data Products, Inc., 5907 Noble Ave., Van Nuys, CA 91411; (818)786-2884.

FRONT RANGE COMPUTER SHOW

Creative Contacts has announced their second annual Front Range Computer Show scheduled for **September 23** in Fort Collins Colorado. Admission is $2.50. Last year's show drew 600 attendees. Creative Contacts, 1108 Elbert Ave., Loveland, CO 80537; (303)669-4183.

LONG DISTANCE USA

US CONGRESS INFORMATION SERVICE

by David Hakala

Online services have helped to organize the presentation and use of information in a sometimes startling manner. And the more information available on a particular subject, the more likely that it needs for organizing. Who generates more information each day than any other single entity? I might nominate our own national congress.

The *Federal Register* is a daily publication of all new proposed and final regulations issued by government agencies, executive orders and other presidential documents, public notices and Sunshine Act meetings. Each edition includes **200-300** announcements, some **4 to 5** Megabytes per day! Depressing, isn't it?

The Washington Post Company has introduced an online subsidiary titled **LEGI-SLATE** to try to bring some order to this river of legislative information. The service is available at (202)898-2300 and covers Congress and the Federal Register. It is used by PACs, industry associations, nonprofit foundations, international news organizations, government agencies and others to flag legislative developments

while there is still time to influence their outcome, compile dossiers on key government players, analyze legislator voting records, even compute the probabilities of passage for different bills. Following the example of the growing legions of semi-commercial small BBS, **LEGI-SLATE** provides unlimited usage for a flat annual fee, a blessed departure from the usual smoke-and-mirrors online price-clock game. Unlike the typical BBS service, the full kit of services available on **LEGI-SLATE** runs a cool $14,500 per year.

LEGI-SLATE's motto is "We won't let you miss a thing;" for once, we believe words uttered in Washington. Automatic update scripts custom-tailored to each user pluck pearls of information from the torrent of raw... um, data... rushing down the Potomac. An army of analysts reads and cross-indexes every single bill word by word; their eye-drops must arrive in tanker trucks. Full-text search capabilities further insure no obscure references or paraphrases slip by the user.

LEGI-SLATE may well be the brightest light ever to shine on Congress. Voting records, for example, include not only floor votes in the full House and Senate, but committee votes as well. Users can identify all bills cosponsored by a member or all members who cosponsored a bill. Legislative history searches reveal how amendments and conference meetings turn proposed budget cuts into overflowing barrels of pork.

Each lawmaker's complete voting record is available, along with "public interest ratings" published by two dozen special interest groups. Pick an opinion, or roll your own from the online data. **LEGI-SLATE** software lets one estimate a given bill's chances based on who's in town when it comes up for a vote. Junket invitations may be strategically planned.

Legislator profiles include these ratings plus biographies from the Almanac of American Politics, committees to which each Congressional member is assigned, campaign contributions and spending, and more. Users can also create private dossiers on **LEGI-SLATE** to store their own intelligence

BOARDWATCH
ONLINE INFORMATION SERVICE
(303)973-4222

Boardwatch Magazine has earned a reputation for providing the most accurate list of electronic bulletin boards and on-line information services available in Colorado. By popular request, we are now offering an online service of our own, the **Boardwatch Online Information Service**

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CURRENT ISSUE ONLINE

The complete text of the current issue of Boardwatch Magazine is available for online viewing each month.

BACK ISSUES ARCHIVES/KEYWORD INDEX

The complete text of back issues of **Boardwatch Magazine** beginning with the January 1988 issue are available for on-line viewing. Additionally, a keyword searchable index to back issues is available online. Simply enter a searchword and the system displays the article title, issue, and page number along with an ID code. Find the article in your printed issue or enter the ID code to call up the actual text of that particular issue online. Finding earlier stories on particular topics or products is now a snap.

BBS LIST DIALING DIRECTORIES AND COMMUNICATION SOFTWARE

Pre-formatted dialing directories for communications shareware programs including Telix, ProComm Plus Test Drive, QModem SST, GT PowerComm, and Boyan. Simply download the dialing directory and place it in your terminal program subdirectory. The entire **Boardwatch** BBS list is available at the touch of a key. Dialing directories are updated each month. The **Boardwatch Online Information Service** will provide the latest versions of online communications software such as Telix, GT PowerComm, ProComm Plus Test Drive, QModem, and more. And finally, select BBS lists brought in from various cities around the nation. Find out what's happening with electronic bulletin boards right from the source - **Boardwatch** Magazine

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on specific lawmakers: constituents in each district, PAC contributions, federal spending received in return and other facts about their relationships with lawmakers. No wonder we've seen a spate of computer-security laws in recent years.

LEGI-SLATE's forte is up-to-the minute coverage of virtually every source of intelligence on political and legislative activity. It offers nearly real-time access to verbatim transcripts of nineteen Congressional committee hearings, hourly updates of committee schedules, news and background briefings from the White House, Pentagon, Departments of State, Commerce, Justice, Treasury and Energy.

Transcripts of speeches, press conferences, interviews and other oral compulsions of domestic and international leaders are available. Television news and interview program transcripts include "*Face the Nation*," "*Meet the Press*," "*This Week with David Brinkley*," CNN's major news interviews, ABC's "*Good Morning America*" (no .GIF files of Joan Loundun, unfortunately), CBS's "*Morning News*," NBC's "*Today*" and the U.S. Information Agency's "*Worldnet*." We were disappointed to learn David Letterman's "*stupid pet tricks*" was omittedbut we assume the service is still in a growth phase.

Other news sources include indexed versions of *The Washington Post, National Journal* and the *CQ Weekly Report*. The Post and NJ are available for full-text search as well as index searching. The delivery and processing of transcripts is especially noteworthy; we are indebted to Alan Holmes, LEGI-SLATE's Manager of Computer Services, for sharing this background information with us. Most oral presentations are transcribed within one hour of their conclusion by aprivate-sector firm called Federal News Service. Transcript text files are broadcast via FM sideband to customers' PCs.

LEGI-SLATE has totally automated the reception and posting of transcripts to its mainframe databases. A dedicated PC runs a background program which monitors incoming data 24 hours a day and writes it to a hard disk. A foreground program frequently checks the hard disk for new data files and uploads any found to the mainframe. Thus full-text transcripts are available for users almost before the transcriber's typewriter has cooled. Indexing is performed during normal business hours by human analysts.

Today's Federal Register is indexed by LEGI-SLATE and put online by noon each day. Search criteria include data, agency, enabling Public Law, Code of Federal Regulations (CFR) citation, and other fields. Older Federal Register editions appear in full-text form, which can be searched by any keywords. Any announcement can be printed in its entirety or only paragraphs containing particular words or phrases.

The status of every bill under consideration is updated daily around noon, Eastern time. The Congressional Record (every official syllable uttered in the House and Senate) goes online the same day it is published by the GPO.

LEGI-SLATE indexes the Congressional Record by word, phrase, chamber, member, bill number, page number and type of activity (debate, remarks on introduction, etc.). Having so many index options lets the user screen out "noise" from desired reports, allowing many LEGI-SLATE users to get by with 1200 baud modems. For example, one may scan for only the debate on a particular bill, omitting intervening text even if the debate occurred on and off over a period of several days.

The real-time intelligence capabilities of LEGI-SLATE are amazing, but the historical data capabilities are also impressive. Much of this detailed information goes back ten years or more. Holmes estimated total database volume at 10 Gigabytes in our interview July 25. Remember, about 5 Mb are added each day Congress is in session; each year adds a stack of typewriter pages over a mile high.

An Amdahl 5860 mainframe handles all this data, with the help of an IBM 3380. Holmes is presiding over an upgrade to an Amdahl 5880 multiprocessor machine. Forty local-call ports often fill up during the afternoons. Callers outside of the 202 area code generally tie in through Telenet or Tymnet. These are the only variable costs of using LEGI-SLATE; there are not connect charges or retrieval fees.

LEGI-SLATE users spend most of their money for information rather than hardware. Holmes finds that his 28 1200-baud local lines fill up before the 12 2400-baud lines. The modems are made by Multitech, and support MNP 3 & 4 data compression protocols, allowing effective throughput up to 4800 baud.

Access to LEGI-SLATE does not come cheap, but considering the wealth of information, uniquely comprehensive services and potential applications it is a bargain. The one-fee price structure is especially attractive to heavy users and inexperienced searchers. Annual subscriptions are sold "95% of the time," according to a marketing contact, but monthly prices are also quoted in LEGI-SLATE's product literature.

Voting records service costs $4,900 per year. The Transcript Service goes for $5,800. Today's index of the Federal Register and full text going back to January, 1985, runs $6,900 per year. "Basic" Congressional coverage costs $9,900, while the comprehensive service will set one back $14,500 a year.

LEGI-SLATE is an outstanding service for politically active organizations, newsrooms, lobbyists and legislative analysts. It is probably not cost-effective for libraries, general information brokers and others whose demand for political insight is irregular.

Political involvement should not be restricted to the well-heeled. The past year has seen a tremendous upsurge in local grassroots special interest groups, a potentially huge market. These groups know that knowledge is power, and that they have a lot of catching up to do before they dive into real-time data. I would like to see LEGI-SLATE's historical data and feature-rich proprietary software made available on CD-ROM at much lower prices, perhaps as an introductory offer to local nonprofit political action groups.

Such a move would benefit LEGI-SLATE's cash flow as well as build a following among growth groups. Its on-line clients pay mainly for instantaneous updates and convenient automatic search and retrieval. Historical data is not a major perceived value. But according to Holmes, searches of historical data consume disproportionate amounts of computer and modem resources. Making such data available on CD would ease hardware-expansion pressure.

LEGI-SLATE: 111 Massachusetts Avenue NW, Washington DC 20001. Voice: (202)898-2300. Fax: (202)842-4748. BBS (202)898-2300.

THE PERSONAL RESOURCE SYSTEM

Gary Funk of Fayetteville Arkansas operates an outstanding TBBS multi-line system as well he probably should. Gary serves as a beta test site for TBBS and does a bit of consulting work installing TBBS systems for would be infopreneurs around the country. His own service, THE PERSONAL RESOURCE SYSTEM, is available at (501)442-8777 on a three line hunt group.

The service offers one of the widest collections of online text files we've found with such titles as *USA Today* (general news), *Boxoffice* (movie reviews), *Zip Beep* (humor), *Business Sense* (business commentary), *SDNet/Works* (shareware reviews), *Online Digital Music Review* (compact disk music reviews) *AMY Today* (Amiga computer newsletter), *C News* (C language programming) and *Zip PC* and *Infomat* (PC industry newsletters). This online cornucopia of information is virtually more than you can read in one session and some of it is quite good.

TPRS also features an extensive set of Fidonet Echomail Conferences. Essentially, these are topical message areas with message content entered from dozens or even hundreds of BBS from around the nation and the world. The messages are passed from machine to machine, a process termed "echoing" hence the reference to "Echomail".

The system does offer some shareware titles for download and most importantly, everything is carefully catalogued and presented in a rational order. Via the *SDNet/Works* publication, there are even reviews of various shareware titles providing in-depth information on the program which is then available for download.

As an eSoft beta test site, Gary has a beta copy of the coming TDBS database product. This is an extension database for TBBS software that provides a true online transactional processing capability. In fact, the TDBS database is fully compatible with dBase III+ program. You can even write applications in dBase development language, compile them under TDBS, and essentially craft an extension to your online service in dBase. I'm sure Phil Becker of eSoft had a mental image of serious corporate sales types entering sales data from the field, querying inventory database information, and so forth. Gary has a bit different view of life. He currently has a ridiculous but quite enjoyable game titled CARD GUPPIES up on a multi-line TBBS system that he wrote in dBase and so added to the system. And I understand he is actively working on a version of TRADEWARS for multiline systems as well. It would appear that TDBS then is giving TBBS multiline systems effectively a doors capability they have sorely needed. And this could be a big boon for TBBS. By opening up the system for more third party development, TBBS could become a very valuable platform for information service operators. Gary Funk, 1729 Cortland, Fayetteville, AR 72703.

LASER COMPUTER HOTLINE

Meredith Instrument Company of Glendale Arizona is one of hundreds of little electronic component mail order firms. But they have reached some notoriety by specializing in a single narrow area of the field - LASERS. And they have used the electronic BBS very effectively as an adjunct to their business. Now in its fourth year, LASERGEMS COMPUTER HOTLINE runs on a beautifully crafted implementation of PC Board software at (602)867-7258. Sysop Gerry McLarty has done a superb job of blending color, software, and in-

formation into a system that is a joy to the eye and provides extremely well organized and presented information on a clearly defined specialty.

They advertise themselves as the **Only Worldwide Hi-Tech Surplus Laser Parts BBS** and we can't think of a single example to attack that contention. Meredith offers a good selection of salvage laser parts for hobbyists and experimenters at what appeared to us to be really attractive prices. And the system provided some fascinating information about lasers.

For example, they describe a device they call a **LASERBUG**. You essentially build this from a kit of parts and we had read about it a few years ago in Radio and Electronics magazine. The device is used to eavesdrop on conversations held in a building as far as 500 feet away. You aim a laser at any large window. Voices within the building cause the window to vibrate - however slightly. The tiny vibration motion of the window modulates the laser beam. A photodiode receiver detects the reflected laser beam and demodulates it to extract the original audio that vibrated the window. In this way, you can hear conversations going on inside the building from a completely safe surveillance area 150 yards or more away from the building. The device costs a couple hundred dollars to put together and Meredith, of course, has just the parts you need.

They also offer a device titled a General Scanning Open Loop Galvanometer for $100 each. They are used to deflect laser beams for light shows. They claim you can use two of these devices to provide X and Y axis control of a laser beam and tie it in with your computer. To what end? Well apparently you can use the laser to paint your computer display on a wall at virtually any size.

We read some fascinating text files on laser healing. Apparently they have a 16 mW Red Helium Neon laser that can be used to stop pain and is reported to be more effective than aspirin. Another file describes veterinary use of this device to treat injured horses.

The company offers lasers from very small solid state diode chip lasers used for communications up to water cooled 30 watt monsters used to burn holes in things. They have several laser light show type units that make laser displays controlled by music. And they have some sort of "Terminator" laser gun sight. Finally, we found a delightful on-line animation slide show and a graphic presentation of the Periodic Table of Elements. If you have any interest in lasers, this is certainly a good place to start your research. Meredith Instrument Company, 6403 North 59th Ave., Glendale, AZ 85301;(602)934-9387. Sysop Gerry McLarty can be reached at (602)992-6626.

BACTERIA DATABASE

Biosis is a not-for-profit organization originally incorporated in **1927** under the name **Biological Abstracts**. They were established to serve the information needs of the biological and life sciences comunity by organizing and tracking the naming conventions for various species, particularly among bacteria specimens.

In **October 1985** they established an online service titled **Taxonomic Reference File** or **TRF** operating at (215)972-6759. The prominent feature of the service is an online database of over **11,000** entries of bacterial taxonomic information. Carol Lock and Keith Pittman operate the system on an old **IBM 5150 PC** using **RBBS-PC 17.1C** software.

Undoubtedly, a detailed database of bacteria names is of value to any number of individuals involved in microbiology. We were certainly and appropriately impressed although we wouldn't know a staphococcus from a Greek freighter. What did get us to sit up a bit was how they did it. RBBS and PCBoard systems have the capability to operate external programs by exiting the main BBS program in what they refer to as Doors. Typically, these doors contain games and so forth. In this case, the door opened onto a fabulous implementation of the **ORACLE DATABASE** program. We had never seen this online before and it opens up some impressive possibilities. BIOSIS,

Special Projects Section, 2100 Arch Street, Philadelphia, PA 19103;(215)587-4917.

HERPETOLOGY NETWORK

Mark Miller operates a TBBS system in Philadelphia to host a rather unusual group of enthusiasts. His **SATRONICS TBBS** system is available at (215)464-3562 and its primary raison d'etre seems to be in support of those who collect, study, and otherwise enjoy snakes, reptiles, and amphibians.

We found some fascinating files on the subject such as Snakes of Saudi Arabia, Medical Treatment of Toad Poisoning, Australian Snakebites, Seasnake Envenomation, Toxic Fish, and a treatise on the Frog-Leg Trade.

An associated message base was particularly active. We read entries from a young lady in Miami who just adored turtles. Apparently she had **13** and all were recently affected by some sort of Turtle Virus. All survived but two died later. One was "egg bound" - apparently a painful afflication where eggs are made but not laid. Despite the surgical removal of the eggs, that one died. We found people who were interested in nothing but sex - but generally they were trying to procure it for their pets who tended to be somewhat rare, exotic, and apparently lonely. One Stefhen Liczwa owns **73** very poisonous snakes that he milks for their venom. The venom is sent to England where they use it to make an anit-venom serum.

One of the frustrating elements of operating a system devoted to a specific theme such as snakes is gettting the word out to others of like interest that you exist. Apparently, Mr. Hill is over that hurdle and enjoys a lively group of reptile lovers. Satronics TBBS, PO Box 52261, Philadelphia, PA 19115; (215)464-3561 voice. HST 9600 support available at (215)698-1905.

CD-ROM MAKES INROADS

by David Hakala

Compact Disc - Read Only Memory (CD-ROM) is entering an exponential growth curve just as fax and cellular phones did a few years ago. The telltales of early acceptance, the steepest part of the growth curve, are cropping up everywhere:

- Producer costs are falling like lead: two years ago it cost **$50,000** to create a master copy of a CD; today's average cost is **$2,500**. Duplication services are advertising prices of **$1.80** to **$3.00** per disc.

- End-user hardware is getting better and cheaper: developers can buy Apple CD-ROM drives for $300. An acquaintance with no particular "in's" recently was quoted $400 for a popular model. Drives that handle both **MS-DOS** and Mac discs are appearing.

- Products are proliferating: two years ago there were barely **200 CD-ROM** titles available. Today there are an estimated **450-500** on the market. The product announcement sections of industry magazines resemble standalone directories.

What are people doing with all that space? **CD-ROM** is ideal for permanent storage of information. Several CD media vendors offer a 100-year guarantee against data decay. An aircraft parts repair firm, for example, must retain drawings and reams of documentation on every job it does for seven years. All the drawings and documentation for the Boeing 757 airliner, some 140 pounds of paper, fit on one **CD-ROM**.

Graphic data takes up enormous amounts of space. One division of the DoD, The Defense Mapping Agency, will singlehandedly double the number of **CD-ROM** titles on the market during the next year. **DMA** will produce **450-500** discs (masters, not copies) in **1990**. It plans to turn out the same num-

CD-ROM PUBLISHERS:

Alde Publishing	612-835-5240	Govt. data, shareware
Aldrich Chemical Company	800-231-8327	Material safety data
Aries Systems Corp.	617-689-9334	Medline, for Mac
Auto-Graphics Inc.	800-325-7961	Govt. periodicals
Bowker Electronic Publishing	800-323-3288	Books/mags in print
BRS Information Technologies	800-468-0908	Medline
Buckmaster Publishing	703-894-5777	Place-Name Index
Cambridge Scientific Abstracts	800-843-7751	Science & Cancer lit
Canadian Ctr. for Occup. Health	416-572-2981	Chemical, OS&H data
CD Productions	415-524-8450	Construction activity
CD/Law Reports Inc.	312-668-8895	Ill. court reports
Chadwyck-Healey Inc.	800-752-0515	Supermap, 1980 Census
Compact Disk Products	212-996-6999	CD audio software
Computer Aided Planning Inc.	616-454-0000	Office furniture catalogs
Comstock Inc.	212-353-8686	Stock Photographs
Data Base Products Inc.	214-233-0593	Transport. databases
DeLorme Mapping Systems	207-865-4171	World atlas
Dept. of Atmospheric Sciences	206-545-0910	Meterological data
Dialog Information	800-334-2564	Govt. data and S&P
Digital Directory Assistance	301-657-8548	Nynex White Pages
Disclosure Inc.	800-843-7747	SEC, financial reports
DNAStar	608-233-5525	Biology, gentics
Donnelly Marketing Info. Srvcs	203-353-7000	Consumer demographics
Educorp USA	800-843-9497	Mac PD/shareware
Ellis Enterprises Inc.	405-235-7660	Bibles
ERM Computer Services Inc.	800-544-3118	Environmental issues
Facts On File	800-322-8755	Apple II shareware
Geovision Inc.	404-448-8224	U. S. Atlas
Grolier Electronic Publishing	800-356-5590	Amer. Acad. Encyclopedia
Hopkins Technology	612-931-9376	Consumer & trade surveys
Information Access Co.	800-227-8431	Magazine indexes
Ingram Book Company	615-361-5000	Book prices & availability
Innovative Technology Inc.	703-734-3000	Federal Catalog System
Institute for Scientific Info.	215-386-0100	Science Citation Index
Intl. Ctr. for Diffraction Data	215-328-9400	Data Powder Diffraction
Inventory Locator Service Inc.	901-794-4784	Federal Parts Catalog
Iowa State Library	515-281-4118	Database: 400 IA libraries
JA Micropublishing Inc.	914-793-2130	Securities firm reports
John Wiley & Sons Inc.	212-850-6000	24-vol. chemistry ref.
Keva Systems	303-936-0076	Hardware/software, Mac/IBM
Lasertrak	303-530-2711	Flight Navigation DB
Library Corp.	800-624-0559	Book prices, libr. catalog
Library of Congress	202-287-1309	Marc Subject Authority
Lotus Development Corp.	617-577-8500	Corp. & Govt. data
McGraw-Hill Book Co.	212-512-2000	Sci. & Tech. References
Michie Co.	804-295-6171	Virginia State Legal Code
Micromedex Inc.	303-623-8600	Drugs, toxicology
Microsoft	206-882-8080	Writers, Programers Refs.
NISC (Water Resources)	301-454-8040	Water Resources Abstracts
Natl. Inst. of Building Sciences	202-347-5710	Military building specs
Natl. Safety Data Corp.	203-859-1162	Material safety data
Natl. Standards Assn. Inc.	800-638-8094	Parts/products US buys
NewsBank Inc	800-223-4739	Primary news material
Newsreel Access Systems Inc.	212-826-2800	Newsreel summaries
Occupational Health Services	212-967-1100	Material safety data
OCLC	614-764-6000	Agri. DBs, library indexes
PC-SIG Inc	408-730-9291	Shareware, lesson plans
PCI Inc. (CANADA)	416-764-0614	Satellite sensing lit

ber of titles every year for the next decade until every square inch of the U. S. is on **CD-ROM.**

Government data is widely used, comes in huge quantities and is inexpensively available on magnetic media from the US Government Printing Office, National Technical Information Service (NTIS), the National Archives, Labor, Agriculture and other departments. The first generation of **CD-ROM**'s enhanced raw government data with search/retrieval, graphic display, and report generation software. This strategy allowed vendors to charge over $1,000 for public information that could be bought on 9-track tape for $125.

But government data is rapidly becoming a commodity. Many agencies are producing their own **CD-ROM** publications, driving retail prices through the floor. **NASA**, for example, is converting all its digital image data from the Mariner and Voyager missions to **CD-ROM**, and pricing the finished discs at just $40 each.

With the easy pickings gone, joint ventures between **CD-ROM** producers and traditional publishers are catching on. Peterson's College Directory is available as a searchable database from SilverPlatter ($595). Dialog offers Standard & Poor's for a mere $4,250 a year with quarterly updates.

The *Academic American Encyclopedia* is a more reasonable $395 from Grolier Electronic Publishing. The CorpTech High Technology Directory is available from Lotus. The CD-ROM version, at $6,500 per year, compares rather favorably to the hard-disk database published by CorpTech for $14,000.

One of the most important benefits of **CD-ROM** is its ability to accomodate more "intelligence" than floppy or even hard disks. The CorpTech database, for example, occupies "only" 40 Mbytes, leaving over 600 Mb theoretically available for enhanced search/retrieval software. **CD-ROM** shifts the ratio of mind-boggling data to helpful software dramatically in favor of the inexperienced user.

CD-ROM may eventually replace videotape as the medium for audiovisual aids. The random-access feature of **CD-ROM** is much better suited to training and self-study than the sequential access of tape. Students accessing multi-user **CD-ROM** networks can proceed at their invdividual speeds instead of marching in lockstep through a tape.

Full-motion video and sound still strain the capacity of CDs; a disc can only hold a few minutes of such data. But slide projections of Lotus 1-2-3 screens and tutorial text files, for example, take up far less space. RAM-resident tutorials are no larger than their magnetic counterparts.

The permanence and high resolution of **CD-ROM** graphics has created a niche market for stock photograph libraries. More discerning art patrons will gasp over the VGA-quality renditions of over 3,000 color portraits from Smithsonian Institution's National Portrait Gallery, along with historical text. Software allows browsing or programmable sequential display, with or without captions. (Abt Books, $480).

Integration of data from large and scattered sources is another convenience offered by **CD-ROM.** MIDI musicians welcome several fairly inexpensive "sound libraries." Microsoft's Bookshelf CD provides a thesaurus, dictionary, The Chicago Style Book and several other writers' tools on one disc. Another Microsoft title, the Business Consultant, integrates 13,000 pages of selected SBA publications and small-business tools from Deloitte, Haskins & Sells. Alde Publishing has combined many sources of government supply and procurement information on a single CD ($199), eliminating one of the worst paper-chases in the free world.

Of course, this article would not be complete without a comprehensive directory of **CD-ROM** hardware and platter vendors. Forget it; Jack doesn't have that much money in his printing budget. But you can obtain one (on **CD-ROM**, of course) for just $89.95 from DDRI, Inc., publishers of **CD-ROM** End-User and Laserdisk Professional (703-237-0682). The **CD-ROM** Source

Disc covers the hardware market, from $500 drives to $98,000 development systems, and includes a database of over 320 **CD-ROM** titles. The five megabytes of data include **CD-ROM** briefings and buyers' guides from Microsoft. It is not available on floppy.

SHAREWARE NOTES

FILE COMPRESSION - MORE ADVANCES - NEW RELEASES

The file compression utility field has become extremely competitive with as many as twenty products on the market and at least four major players vying for the top spot. For several years, System Enhancement Associates (SEA) seemed to be the top product with their ARC utility. They were so successful, in fact, that the name of their ARC product became synonymous with the process of ARChiving files into a compressed file for transportation. Due to some legal difficulties between several of the market participants, the ARC standard has largely disintegrated leaving most of the user community wrestling with the problem of which file compression utility to use.

The good news is that abandoning the standard ARC concept has lead to some heady advances in archive algorithm technology. Today's programs create much smaller archive files than previously was thought possible.

Essentially archive utilities fill an economic role in online communications. The flow of information from one area of the country to another is largely handled by individual sysops and users who are paying the long distance charges to make the connection from one system to another. Since the typical IBM program may require twenty or thirty individual files to operate, software simply wouldn't be transferred by modem without archive utility' software. These utilities gather the twenty files into one single file entity for the purposes of storage and transport. In the process, they also perform a variety of compression operations on them using some fairly sophisticated statistical algorithms. This is

based on the fact that most files contain a lot of spaces and other repeating characters that can be represented mathematically in just a few bytes rather than as data taking up hundreds of bytes. Essentially, these utilities squeeze all the "air" out of the files when they combine them into a single archive file.

The result is that a single program titled **RIPWORD** for example that consisted of **26** files totalling **100 KB** of size could be compressed and archived to a single file titled **RIPWORD.ARC 54 KB** in size. Not only did all the little files go away, but so did **46 KB** of file. To transport by modem, you now have to perform only one upload/download operation rather than twenty, and as an added bonus because of the reduced file size, the **54 KB** file would require about four minutes and ten seconds to upload at 2400 bps. The original **100 KB** would have taken seven minutes and **45** seconds. This saves about 3 1/2 minutes of connect time and even at nighttime long distance rates the cost of transporting this program long distance decreases by at least **42** cents. If you upload/download several hundred programs - many much larger than our hypothetical **RIPWORD** - each year, the economic impact of archive utilities cannot be ignored.

In just the past month, three major utility program players have released new versions of their popular programs. NoGate Consulting has released version **2.0** of their **PAK** program. PKWare plans a release of version **1.0** of their very popular **PKZIP** program. And finally, **LHARC**, a rather odd but very effective entry from Japan, may or may not have a new version **1.14** release on the street.

The **LHARC** story is fascinating. A group of Japanese hobbyists collaborated on the development of this utility. It was introduced by upload into the US this past March with virtually no documentation of any kind. It is free and there is no shareware registration free. It has produced the smallest archive files to date. But no one knows the authors address, and the **1.14** version appears to be an illegitimate although harmless release. The only difference in **1.14** seems to be the fact that the resulting archive file name extensions are

now **.ICE** rather than the previous **.LZH.** The gentleman currently credited with being the author of **LHARC** is Haruyasu Yoshizaki of Japan.

To test the latest releases of these programs, we archived an entire subdirectory containing the Multimate word processor by Ashton Tate, all of its utility files, and about a hundred document files. This provides a good mix of text and program files representing actual use of the utility. Our test subdirectory then consisted of **193** files totalling **3,172,035** bytes of data. Compression results are as follows:

UTILITY	SIZE	REDUCTION
LHARC 1.14	1,665,519	47.5%
PKZIP 1.0	1,681,425	47.0%
PAK 2.0	1,700,279	46.4%
ARC 6.02	2,059.674	35.0%

In previous tests, the resulting archive sizes varied widely. With the latest releases, compression values have closed up considerably. Of the top three, there is really only a slight difference of about **34 KB** or **1.1%**.

As to speed, there were some notable differences as shown below along with teh identifying file extensions:

UTILITY	TIME	EXTENSION
ARC 6.02	4:02	.ARC
PKZIP 1.0	5:52	.ZIP
PAK 2.0	6:40	.PAK
LHARC	9:02	.ICE or .LZH

The **LHARC** program which performed the highest degree of compression, took twice as long to do it as **ARC** which performed the least compression. But clearly, taking the two tests as a whole, PKWare's **PKZIP** program is the overall choice as file compression algorithm. Its final archive file size was within **16 KB** of **LHARC** while cutting over three minutes from its operating time. And note that all tests in the case of PKZip were performed with a beta test copy rather than final release. The

final **1.0** version available by the time you read this may offer speed and file size improvements yet.

GT POWER 15.00 RELEASED

P&M Software has announced the release of version **15.00** of their popular communications terminal software for IBM compatibles titled **GT POWER**. The program has actually grown to become a combination mini-BBS system and terminal package occupying five separate files GT1500_1.ARC through GT1500_5.ARC.

The terminal emulation package is notable in that it features an immense and highly facile **1000** entry dialing directory and a variety of file transfer protocols. Notable in this release is the addition of Erikson Lab's **BIMODEM** file transfer protocol. BiModem actually allows callers to upload software and download software simultaneously. This takes advantage of the fact that the modem is essentially a full-duplex device - it allows simultaneous two way data flow. Most programs blast data in

one direction only during file transfer and use the reverse channel to "acknowledge" each block of data although the acknowledge occurs infrequently. Bi-Modem routes data in both directions and thereby allows the simultaneous transfer with no decrease in file transfer speed. Additionally, it will allow the caller to chat with the sysop over the same lines while the transfer is going on.

BiModem is without doubt an elegant piece of technical work. There are two minor complications. It requires the protocol be available both in the callers terminal package and on the BBS end. Secondly, it is not at all clear that there is any need for two-way file transfer capability.

While the second element will remain an open question, GT Power does address the first. Because the GT Power package provides both a BBS and a terminal emulation/communications program, it is a natural to introduce Bi-Modem to the world.

Although the version **15.00** upgrade provides a total of **59** product enhancement/bug fixes, most have to do with the BBS operation. The product retains an annoying bug included by the author Paul Meiners deliberately to increase the time it takes to load and run the program by **1/50th** of a second each time it is used. Eventually this can reach a total loading delay period of sixty seconds. This ostensibly will motivate users to "register" their copies of GT Power and thus receive a "key" patch program to fix this "bug" so that they can load and run the program immediately. Mr. Meiners has experimented with a number of innovative if slightly cynical ploys to increase the number of registrations of his product in the past. P&M Software, 3104 East Camelback Road #503, Phoenix, AZ 85016; **(602)285-1146** BBS; **(602)285-9914** VOICE

BUILDING A BASIC MULTILINE SYSTEM

A recent article in *INVESTORS DAILY* by Charles Pluckhan described the emerging cottage industry in online information services and gave *Boardwatch* as a reference to the field. As a result, we've received numerous calls from individuals who want to start an online service but were worried about the cost and technology required to run a reasonably professional online information service.

To accomodate this growing interest, we are going to increase our coverage of the specific hardware and software required to start an online information service from the ground up. In this issue, we will design a fully functional and capable multiline system and examine some of the issues affecting your decisions in beginning one. In future issues, we intend to expand on this concept and look at alternate software and hardware options and perhaps delve a bit into packet switching networks and the ties you may forge in the future to larger services and **RBOC** gateway systems.

TELEPHONE LINES

One key question that comes up in starting an online system revolves around the issue of line loading. This can become a complex statistical process to calculate based on a variety of factors. But in real life when dealing with your own time and money, it can actually be pretty easy to arrive at some quick figures.

Basically, to run any type of commercial operation, no matter how modest, requires the use of multiple access telephone lines. Hobby BBS typically operate on a single telephone line. If the system is any good at all, and many hobby systems can serve as models for the industry, they quickly "fill up". By this I mean that so many individuals call the system that any single user wishing to access it is faced with endless busy signal tones. While this is acceptable in the hobby community where the system is essentially free of charge, it is con-

sidered an enormous faux pas to accept paying subscribers to your system and then allow them to fight over who gets in and who gets the busy signal.

Since excellent single line BBS software is available for as little as $25, and multiline software is at least several hundred dollars, many prospective operators are tempted to start out single line and move to multiline once the "concept is proven" and the bugs are out. Bad idea. If your idea for an information service does take off, you will find yourself with a rapidly climbing customer base at a time when you need to stop, shut down, and convert to a different software system. If you know nothing about setting up BBS software, take your projected conversion time and double it. If you are familiar with operating systems already, triple it. And if you know all there is to know about it, it may never get done.

There are exceptions to this rule, Galacticomm, Wildcat, and TBBS all offer single line versions of their software at a reduced price and upgrade policies are quite fair. Essentially the upgrade from single line to multiline should be fairly painless in this instance. But be absolutely certain what differences, if any, exist between the single line and multiline versions. Some commands/menu types may not be implemented on both versions.

Oddly, most new operators over estimate the number of callers they will have and so usually start out with too many telephone lines incurring needless expense. Most picture thousands of callers all dialing in and spending hours online as soon as the doors open. The reality is that online services are like any other publication and subscribers are gained one at a time until a "take-off" point is reached.

A good rule of thumb is that a single telephone line can handle 35 calls daily and multiple lines can handle about 50 each. This sounds ridiculous on the face of it. But statistically, multiple lines provide a type of "multiplex" similar to increasing the number of dice you roll to get all sixes. As the number of dice go up, the chances of all sixes go down.

Similarly, as the number of lines go up, the chances of them all being busy simultaneously go down as well.

The typical caller dials twice weekly for about 17 minutes each call. You can typically handle 150 regular users per line. If you think you will have 600 regular callers, you need at least four lines. This can vary depending on the type of caller you attract and the type of information you present. Search databases and text information typically results in shorter calls. Software downloads and games result in longer ones.

The big problem is that loading is never level. Usually 5 to 9 PM are the peak calling hours for most consumer services with little going on in the day. Business services usually peak in the late morning or early afternoon. Some days of the week are higher than others. Hobby systems seem to go wild on Friday evenings. Oddly Tuesdays are popular as well.

The type of telephone service you order is important. While hobby systems typically operate on a residential line, commercial information systems/BBS should use business telephone lines. You want all your business lines installed with what is variously known as a hunt group option, rollover, or ring down. Essentially what this means is that if someone calls line 1 and it is busy, the call is rerouted to line 2. If both lines 1 and 2 are busy, the call is routed to line 3 and so on to the last line in the hunt group. If all lines are full, then a busy signal is generated.

Business service typically costs $100 per line installation and about the same for a refundable deposit. So you may wish to plan on $200 per line installation. Business service with the hunt group option typically costs about $50 per month. There are a few ways to reduce this amount. Since your callers will be calling in rather than you calling out, ask about measured service options or "incoming only" lines. You will **NOT** need touch tone service and you will not need any of the usual call forwarding, call waiting, and other optional services.

Our model system is going to assume an initially moderate number of callers and we will start out with four telephone lines. But we want to design it to grow to eight, sixteen, or even 32 lines very quickly if need be. Telephone lines will then be $800 installation/deposit and about $200 per month to operate.

COMPUTER SOFTWARE

The type of hardware you use for your online system is largely mandated by your software. The price of both has been dropping steadily but they comprise the bulk of our investment in the system. There are essentially two approaches to multiline software. You can run multiple copies of a single line program, or a single copy of a multiline program.

Programs such as PC Board and Wildcat do a pretty good job as multiline packages. But in reality, they are not multiline. To perform multiline access, you load and run an individual copy of the same software on multiple machines. They are networked together so that they each access common file and message areas. This is actually running a LAN with a modem on each node. The advantage is that if one node goes down, your system still runs. Further, operation of the any node is not decreased because of additional callers on other nodes. Additionally, there is hardly any end to how many nodes you can add up to the maximum allowed by whatever LAN system you run. It is also possible to run two nodes on a single machine using partitioning software such as Desqview. And finally, there are "computers on a card" you can use to add essentially a machine per slot on your mother board to provide another node.

The disadvantage is that the system quickly becomes large and complex and it requires an immense amount of hardware and software to operate. For an eight line system, you are talking about wiring up eight computers on a LAN and running BBS software on each - an expensive and complicated task.

Software such as **TBBS, DLX, GALACTICOMM,** and several titles under **SCO XENIX** offer another route. They run a single software application on a single machine with multiple serial ports. **XENIX** and **UNIX** are multiple access operating systems which can run any third-party Unix compatible BBS and allow multiple callers. But Unix-based BBS software is uncommon and spartan in its presentation. Galacticomm features multiple callers on a single system and allows third party addon programs. But it can require very complex customization in the C programming language and the company offers a confusing array of options, upgrades, and programs. Whatever you bought, you need something else for just a few hundred dollars more.

DLX and **TBBS** both run on a single machine and both use the same multiserial port hardware. They are each about the same price for a sixteen line version. Typically governmental and business applications have gone for TBBS and the social/sex chatline/entertainment services have done very well with **DLX. TBBS** comes in single-line, 16-line, and 32-line versions. For our model system we are going to chose TBBS 2.1m in the 16-line version at $895 list. It provides a very flexible presentation for menus and text files, runs on a single machine, has excellent performance characteristics, and we happen to know that they are working on a **September 1989** release of a **dBase III+** compatible extension database that will not only allow us full online database transaction processing but we will be able to add to the function of the BBS using the popular dBase development language. This extension will cost another **$995** for a total software investment of **$1890**. That's a bit high for software, but it holds our hardware costs down and allows expansion up to sixteen lines if we need it later at no additional software cost and they will upgrade us to 32 lines if we need that at additional cost.

HARDWARE

There is some absolutely fascinating news for everyone considering an online information service. Computer equipment prices have been falling like

stones. To run an effective four-line system, we could conceivably get by with an IBM XT type machine. We could certainly do it with a **12 MHz AT** class unit. But we know that everyone in Kingdom Come will want to dial our model system and we want good quick response for each of them and room to grow to **16** or **32** lines at the drop of a hat. A **20 MHz 80386** system would be a good approach at this point. The faster the better and the **80486** machines just around the corner are quite promising. But for reasons of cost, we can settle on a basic stripped-down plain vanilla **80386 IBM** compatible unit. No names. Compaqs, Everex's, AST's, IBM's and so forth are just dandy. Love to use em, love to write about em. If its my money, I want a very plain 80386 clone made in a local shop and put in a tower case with a big power supply, **1 MB** of RAM, a monochrome screen, and a keyboard. I think we can get it for $2200 with no disk drive.

We will need a disk drive. Here is an opportunity to save a bundle by buying some clutzy **80 msec** wreck from two years ago. We're going to pass on that because we know that disk drive access times are the largest determinant of system speed and capacity. We want something under **20 ms** in access time and it just has to be **40 MB** or larger. Services offering shareware downloads need a minimum of **500 MB** of disk real estate to be competitive and most of the big boards are over **1 GIGABYTE** in drive size. But for an information service that does **NOT** specialize in shareware downloads, we could probably get by on **70 MB** of file storage initially. This is something that is not really difficult to upgrade later. Hard Drive International of Tempe Arizona will send us a half-height **Miniscribe M3085** model with **71 MB** of storage and an **18 ms** access time for $579. We could go with the larger and faster **160 MB Miniscribe M3180E** featuring a **16 ms** access time for $1375. But lets stick with the smaller **M3085** for now and spend about $500 on a good tape backup unit instead.

Why? Because shit happens. If we have a couple of hundred paying subscribers calling each evening and suddenly our hard disk starts flipping platters through the front glass window, we simply

replace the drive and restore from the tape backup we thoughtfully made just a few nights before. A couple of people miss a few messages that were lost, we apologize a lot, and ruefully acknowledge that not all was well that evening. Had we not invested in the tape backup unit and made those weekly or perhaps daily backups, we could have shut down the system for about two weeks of twenty-four-hour days while we tried to reconstruct what we thought we had done when we set up the system. When we do get back up, everything anyone who called remembers seeing is either gone forever or moved. This is not good.

The basic IBM compatible computer comes with two serial ports. We want to hook up four telephone lines. So we need a device to supply additional serial ports. **TBBS** works best with a device termed a **DigiBoard** by DigiBoard Inc. of St. Louis Park MN. Their **PC-8** model provides our eight ports for a list price of $695 and we can add additional ones to our machine and daisy them together if we need more in the future. Yes they do have a four port model but it is NOT half the cost of the eight port model and we want instant expansion capability. The device takes up one card slot in our machine and has an octopus of eight cables that connect to the rear of the computer providing eight RS-232 connectors for modems.

Total hardware cost: **$4074**

MODEMS

This is one area where the little guy wins pretty big. Compuserve and GEnie and the packet switching services all have thousands of **1200 bps** and **2400 bps** modems. To upgrade them will cost a fortune and not all callers can take advantage of it anyway. But the real information service of the future will accomodate the faster modems now coming into play. Thanks to a new Rockwell Chip Set, **9600 bps** modems that comply with the **CCITT V.32** standard are now available at attainable, if still a bit breathy prices.

There are a number of **9600 bps** modems out there and some are appearing as real bargains right now. The

reason is that they do NOT support the **CCITT V.32** standard. Hayes is one of the worst offenders at this writing. Microcom, Multitech, and US Robotics all have excellent **9600 V.32** modems out on the market. We are going to pull a two pronged play here to maximize our modem dollars.

First we are going to go with US Robotics HST modems. Why? For one thing, they give about a 50% discount to information service operators. They must want our business. We're nice guys. We'll give them what they want. Secondly, US Robotics has made some pretty startling inroads with the techie types across the country using this ploy on their earlier models. They sold all the BBS sysops their 9600 HSTs at 50% off when all the **9600 bps** modems did **NOT** comply with **V.32**. If you wanted to call your local BBS at 9600 bps, you had to get a US Robotics **9600 bps** modem to do it. A Hayes or Microcom wouldn't connect either to the USR or to each other at that speed. So there are a lot of old **HST 9600 bps** modems out there.

US Robotics offers what they call a **Courier HST Dual Standard** model that supports both the old HST standard and the new **CCITT V.32** standard. With this device we can offer **9600 bps** and better transmission to callers with the new Multitech, Racal, Telebit, or Microcom V.32 modems, and all the existing US Robotics people as well. And US Robotics will sell us these modems for $725 each under their sysop discount program.

Secondly, we will split our four lines between the **Dual Standard** model, and their cheaper **Courier 2400** model. Then we put the two 2400 bps modems on lines 1 and 2 and the **Dual Standard** V.32 models on lines 3 and 4. We will announce line 1 telephone number as our 2400 bps service and the line three telephone number as our 9600 bps service. The majority of callers at this point are still 1200 or 2400 bps. If they call line 1, they have a choice of four possible lines they could connect to. Remember that the high speed **Courier HST Dual Standard** models will fall back to the lower 1200 and 2400 bps speeds easily. Anyone equipped with an **HST** or the newer **Dual Standard** can

call line **3**. They will be connected to either **3** or **4** but never to **1** or **2** because of the way hunt groups work. In this way they have a choice of two modems, both of which will support the higher speed. So we can offer **9600 bps** operation to those who need it.

Cost: 2 HST Dual Standards **$1450**: 2 Courier 2400 **$ 500 Total: $1950**

SUMMARY

The four line system we've described has a total up and connected cost as follows:

SUMMARY	
TELEPHONE INST:	$800
SOFTWARE:	$1890
HARDWARE:	$4074
MODEMS:	$1950
TOTAL:	$8714

Further, we can upgrade to eight lines by simply installing four more telephone lines and four more modems on our existing hardware/software at an additional cost of **$1800**. Our next eight lines would require an additional Digiboard for an expense of **$4295** with line installation and **2400 bps** modems.

Here's what our system breakdown looks like:

LINES	COST	PER LINE
Four	$8714	$2178.5
Eight	$10,514	$1314.25
Sixteen	$14,809	$ 925.56

At the **16** line level, we could conceivably accomodate **800** callers daily and assuming two calls per week per caller - a pool of 2800 subscribers. If our annual rate is **$35** we would gross **$98,000** and at **$50** we would gross **$140,000** with a total investment of **$14,809** and a **$12,800** per year telephone bill. We would also get **$1600** in telephone deposits back at the end of

the first year. At this point the technical problem is pretty much taken care of, more pressing is the problem of obtaining **2800** subscribers.

Above sixteen lines, the system begins to change but always in our favor. We can bring in **T1** telephone trunks offering **24** lines for as little as **$950** monthly. We can begin to look at tying into packet switching networks such as Tymnet, Telenet, General Electric, or Compuserve's own network. We'll look at some of these options in coming issues.

RESOURCES
Hard Drives International 1912 West Fourth Street Tempe, AZ 85281 (800)234-DISK **US Robotics** 8100 North McCormick Blvd. Skokie, IL 60076 (800)DIAL-USR voice (312)982-5092 BBS **eSoft, Inc.** 15220 E. Girard Ave. Suite 2550 Aurora, CO 80014 (303)699-6565 voice (303)699-8222 BBS **DigiBoard, Inc.** 6751 Oxford Street St. Louis Park, MN 55426 (612)922-8055

EDITOR'S NOTES

This issue marks the beginning of the autumn season and with it a corresponding increase in activity. This should be a good period for online services. Hardware and modem prices are dropping, the software is improving with true online database capability just around the corner. And increasing numbers of people are discovering the added utility they can get from their computer by connecting with the national "supercomputer" made up of us all.

We re-read an old document by JCR Licklider circa 1968 titled "What will on-line interactive communities be like?" Since this prognostication has reached the age of majority this year, it is curious to review it in light of the advances made, and not made, during that period. Mr. Licklider essentially foresaw an era where individuals chose their friends and associates online based on common interests and abilities rather than primarily because of physical proximity dictated by the vagaries of chance and geography. It is curious to note that Licklider's view of the future was curiously accurate, and at the same time a bit off the mark. His view of what online socializing would do was quite on target. Many online aficianados have friends and business clients they've never actually seen in person. But in another sense, we think Licklider might be discouraged to learn how few would participate in this electronic village 21 years later. It is unlikely that more than 5% of the population has access to a modem.

The eminent entry of American Telephone and Telegraph into the mainstream of online information se vices could change that. For one thir anything AT&T does will be natiowi in scope while the RBOC gateway e forts are necessarily limited in geography. And geography doesn't really have an online component - if anything, peak and off-peak time periods are the real geography of online services. And any information provider that does make arrangements with AT&T instantly gains access to a national audience.

More importantly, the entry of AT&T, Prodigy, the RBOC gateways, and Minitel, however able or not each individual system is, contributes to our view of a global supercomputer network accessible from the desktop of the individual and providing access to all the world's information. And with each effort, a larger segment of the population will be drawn into the game. When twenty percent or thirty percent of the population is online, who knows what might come of it.

Stay Connected
Jack Rickard
Editor

BOARDWATCH MAGAZINE

NATIONAL LIST OF ELECTRONIC BULLETIN BOARD SYSTEMS AND ON-LINE INFORMATION SERVICES - SEPTEMBER 1989

SERVICE	PHONE	DESCRIPTION	SPONSOR/SYSOP	LOCATION
ADA Information Clearinghouse	(202)694-0215	Information on ADA Programming Language/Military Specs	Department of Defense	Washington, D.C.
ANARC BBS	(913)345-1978	World Radio/TV Handbook - Short Wave Freq Lists/Scheds.	Assoc. of North American Radio Clubs	
Ashton-Tate Technical Support	(213)538-6196	dBase and Multimate Software Support System.	Ashton-Tate Corporation	Torrance CA
AST Technical Services BBS	(714)852-1872	Superb support system for AST Computer Products.	AST Research Inc.	Irvine CA
AT&T Support BBS	(201)769-6397	Support for PC 6300 and Other AT&T PC Models	American Telephone/Telegraph PC Division	Plainfield
BBS Press Service	(913)478-9239	Home of INFOMAT Online Weekly PC News Magazine	Alan Bechtold/BBS Press Service	Topeka KS
Big Peach BBS	(404)446-6650	Home of Automenu and Treeview Software	Marshall Magee/Magee Enterprises	Norcross GA
Big Sky Telegraph	(406)683-7680	Educational Plans/Services to Rural Montanna Schools	Montanna Rural Education Network	Dillon MT
Boston Citinet	(617)439-5699	City of Boston Information Service - Advertising Supported	Advanced Videotext Systems	Boston MA
Brown Bag Software BBS	(408)371-7654	Power Menu/ PC Outline Software Support	Brown Bag Software	Campbell CA
ButtonWare BBS	(206)454-2629	PC-File dB / PC-Calc / PC-Type Software Support	Jim Button/ButtonWare	Bellevue WA
C.A.R.L. Library Service	(303)830-1165	Citations to 2 Million Texts in Colorado Library System FREE	Colorado Alliance of Research Libraries	Denver
Canada Remote Systems	(416)232-0442	Probably Canada's largest BBS/Online Information Service	Jud Newell . . Toronto	Ontario
CatHouse BBS 206/2901	(805)395-0650	Multiline Support System for Wildcat BBS Software	Mustang Software	Bakersfield CA
Census Bureau Office Automation	(301)763-4576	Microcomputers and Office Automation	US Dept. of Commerce/Nevins Frankel	Suitland
Census Bureau Personnel Division	(301)763-4574	Employment Opportunities Within the Census Bureau	US Dept. of Commerce/Nevins Frankel	Suitland
Channel 1	(617)354-5776	Twenty-line New England PCBoard System	Brian Miller/Tess Heder	Cambridge MA
Classi Computer Fieds	(317)359-5199	Online System for Classified Advertisements	Steve Edsall/Trader	Indiannapolis
Clean Air BBS	(408)298-4277	Environmental Health/Cigarette Smoking Topics	American Lung Association/ Sheila Blash	San Jose
Cleveland Freenet	(216)368-3888	Cleveland City Information/Ohio Governor's Office Online	Case Western University/AT&T/Ohio Bell	Cleveland
Computer Business Services	(714)396-0014	Computer Columnist John C. Dvorak's office BBS	John C. Dvorak and Nick Anis Jr. . Diamond Bar	
Computing Canada Online	(416)497-5263	Adjunct to Excellent Canadian PC Newspaper	Computing Canada Newspaper	Willowdale Ontario
Dante Project BBS	(603)643-6310	Commentary/Research on Dante's Divinia Comedia	Dartmouth College	Hanover NH
Economic Bulletin Board	(202)566-4602	Economic Statistics/GNP/CPI/Labor Data	US Department of Commerce/Ken Rogers	Washington, D.C.
ELISA II	(202)697-3632	Export License Status Advisor - Technology Export Issues	Defense Technology Security Admin.	Washington, D.C.
Energy Info Admin E-Publications	(202)586-8658	Variety of Petroleum/Coal/Electricity Energy Statistics	US Department of Energy	Washington, D.C.
Event Horizons	(503)777-1578	Digitized Graphics Image Library	Jim Maxey . . Portland	OR
EXEC-PC	(414)964-5160	Largest BBS in US - 90 Lines - 70,000 files - 4 Gigabytes	Bob Mahoney. Shorewood	WI
Family Radio Forum Headquarters	(415)562-5483	Center for Nationwide Network of Family/Christian BBS	. . . Oakland	CA
FCC Public Access Link	(301)725-1072	Equipment Authorization Status Advisory Service	Federal Communications Commission	Columbia
Federal Depcsit Insurance Corp.	(202)737-7264	General Microcomputer Information	R. Campbell and L. Rudolph	Washington, D.C.
Federal Job Information Center	(313)226-4423	Federal Job Opportunity Lists available online	US Office of Personnel Management	Detroit
FEDLINK ALIX	(202)287-9656	Info on Federal Libraries - Excerpts Library of Congress News	Federal Library Information Network	Washington,D.C.
Forbin Project, The	(319)233-6157	Home of QModem SST Communications Software	John Friel III . Cedar Falls	IA
GAO Bulletin Board	(202)275-1050	Lotus/dBase/Word Perfect User Tips	US General Accounting Office/Sheryl Lee	Washington, D.C.
Global Seismolcgy Online Service	(303)279-6374	Earthquake Epicenter Data - Geomagnetism NEIS/QED	US Geological Survey	Boulder CO
Greenpeace Environet	(415)861-6503	Ecological and Peace Issues - Disarmament/Toxics/Wildlife	Dick Dillman/Greenpeace	
GT PowerComm BBS	(713)772-2090	Home of GT Power Communications Software	Paul Meiners/P&M Software	Houston TX
Hay Locator	(317)494-6643	Database of Hay/Straw Suppliers and Buyers	Purdue Univ. Agricultural Computer Net	
Hayes Advanced Systems Support	(800)US-HAYES	Eight Line Hayes Modem Support BBS	Hayes Microcomputer Products	Norcross GA
Herpnet/Satronics TBBS	(215)698-1905	Reptile and Amphibian Studies - Poison Snakes/Toads/Fish	Mark Miller . . Philadelphia	PA
IBM Users Group Support BBS	(404)988-2790	IBM PC User Groups Database - Newsletter Exchange	IBM National Support Center	Atlanta GA
Info-Source Canada	(416)574-1313	Online publications	Eric Feistmantl	Hamilton Ontario
Information Resources Services	(202)535-7661	Fed Micro Procurement Rpts. - List of Banned Contractors	General Services Administration	Washington, D.C.
Intel Support BBS	(503)645-6275	Support for Intel PC Products - Inboard 386/AboveBoard 286	Intel Corporation PCEO Division	Hillsborough
IRS Tax Practitioner BBS	(208)334-1763	Income Tax Information - Questions Answered in 48 Hours	Internal Revenue Service - Boise Office	Boise
JAG-NET	(202)325-0748	Navy Judge Advocate General's Information Network	US. Dept. of Navy / Chris Buechler	Arlington VA
JOBBS	(404)992-8937	Online Job Listings - 2186 Technical Pos. - 10,000 Corps.	Alpha Systems Inc/Bill Griffin	Roswell GA
Lasergems Computer Hotline	(602)867-7258	Mail Order Laser Salvage/Supply - Laser Eavesdropping Device	Meredith Instrument Company	Glendale AZ
LUMINA	(612)626-2206	Libraries of Univ.of Minnesota Integrated Net Access7E1VT100	University of Minnesota	Twin Cities MN
MCI Consultants Support BBS	(800)873-5548	Long Distance Rates/Technical Advice for Comm Consultants	Curtis Abrue/MCI Telecommunications Inc.	
Micro Message Service	(919)779-9674	USA Today/Newsbytes/Boxoffice Magazines - 400+MB Download	Mike Stroud . Raleigh	NC
Microrim Technical Support BBS	(206)881-8119	Support for Popular R:Base Relational Data Base System	Microrim Corporation	Redmond WA

BBS Name	Phone	Description	Organization/Contact	Location
NANci BBS	(202)475-1973	Online Version of Naval Aviation News Magazine	Naval Aviation News/Cmdr. John Norton	Washington, D.C.
NARDAC BBS	(804)445-1627	Zenith Computer Support - List of Federal Micro User Groups	Navy Regional Data Automation Center	NAS Norfolk
NASA Spacelink	(205)895-0028	NASA Educational Affairs Div. - Flight Data/Space History	Marshall Space Flight Center	Huntsville, AL
National Agricultural Library	(301)344-8510	Agricultural Info/Research Resources	US Department of Agriculture	Beltsville, MD
National E-Mail Registry	(800)622-0505	Register Your E-Mail Addresses Online - No Charge	National E-Mail Registry	Trevose, PA
National Genealogical BBS	(703)528-2612	Family History - Genealogical Research - Gravestone Haunting	National Genealogical Society	Arlington, VA
National Inst Science Technology	(301)948-5717	Micro Elect.Info Exchange - Virus Protection/Security Issues	National Inst. of Science and Technology	Gaithersburg
National Publishers Exchange	(813)989-1087	Headquarters for NPE Newsletter - Desktop Publishing	Ed Aborn	Tampa, FL
NAVWESA	(202)433-6639	Naval Weapons Engineering Support	Dept. of Navy / Bill Walsh	Washinton, D.C.
New York Macintosh Users'Group	(212)932-9513	Macintosh Downloads - MAC Street JournalNewsletter	Darryl Peck/New York Mac Users' Group	New York
NIST ACTS	(303)494-4775	Automated Computer Telephone Service - Sync PC to NBS Time	Nat. Institute for Standards/Technology	Boulder
NOAA	(303)497-5000	Solar Flare/Geomagnetic Data Online	National Oceanographic/Atmospheric Admin	Boulder
NOAA Information Technology Exch	(301)770-0069	Microcomputer Applications and Recommendations	National Oceanographic/Atmospheric Admin	Rockville
North Dakota State University	(701)237-8661	University BBS - Enter Class 20	University of North Dakota/Pete Lambertz	Fargo
Northrop Career Access	(213)938-5532	Northrop Aerospace Employment Opportunities - 7N2	Northrop Corp B2 Division	Pico Rivera, CA
N'YCENET BBS	(212)769-0550	New York City Education Network	New York City Board of Education	New York City
OCRWM Infolink	(202)586-9359	Radioactive Waste Disposal/Hazardous Materials Handling	Office of Civilian Radiation/Waste Mgmt.	Washington, D.C.
OERI BBS	(800)222-4922	Educational Statistics and Data - Performance Stats -	US Department of Education	Washington, D.C.
Online Store DLX	(805)656-0379	Online Catalog of PC Hardware/Peripherals - Online Mailorder	Stan Snyder/Online Store	Ventura, CA
PHYSICS Forum BBS	(413)545-1959	Physics and Astronomical Sciences	Univ.of Mass. Dept. of Physics/Astronomy	Amherst
PKWare BBS	(414)352-7176	Home of PKARC and PKZIP File Compression Utilities	Phil Katz/PKWare Incorporated	Glendale, WI
Popular Mechanics Online BBS	(212)582-8369	Automotive, Home/Shop, Electronics/Photography, Science	Popular Mechanics Magazine	New York, NY
ProComm Support BBS	(314)474-8477	Home of ProComm 2.4.2 and ProComm Plus Comm Prgms	Thomas Smith/DataStorm Technologies Inc.	Columbia
Public Brand Software BBS	(317)856-2087	Commercial Shareware Vendor	Public Brand Software	Indianapolis, IN
Publishers Information Svce.	(312)342-6919	Xerox Ventura Publisher Support/Laser Printing/Scanning	George Weiners	Chicago, IL
Radio Electronics BBS	(516)293-2283	Radio Electronics Magazine Online Adjunct	Gemsback Publications	Farmingdale
Rocky Mountain High	(719)632-2658	Political Discussions - Unix UUCP Public Access - Multiline	Dave Hughes Colorado Springs	CO
SALEMDUG BBS	(202)646-2887	Hazardous Materials/National Damn Watch/Emergency Info	Federal Emergency Management Agency	Washington, D.C.
Scenix Network	(213)372-2282	USA Today - BoxOffice Magazine - Local Real Estate	Connie Trantham/Steve Campbell	Manhattan Beach
Science Resource Studies BBS	(202)634-1764	Federal R&D Budget - Technical Labor Market Statistics	National Science Foundation	Washington, D.C.
SEAboardl	(201)473-1991	Support system for ARC, SEADOG, and AXE software.	System Enhancement Associates	Wayne, NJ
Second Ring, The	(203)268-5315	Home of RBBS Software	Tom Mack	Trunbull, CT
Silicon Valley Information Ctr.	(408)277-5758	Online Computer Magazine Index - Logon PUBLIC	San Jose Public Library	San Jose, CA
Society for Technical Comm. BBS	(202)393-3557	STC Job Service, Freelance Registry - Technical Writers	Society for Technical Communication	Washington, D.C.
Synergy	(617)769-5468	Turbo Basic/Turbo C/Quick C/Turbo Pascal/Assembly Language	Gerry Powers/Jim Boxmeyer	Norwood, MA
Take 3 BBS	(602)482-1001	Reviews of Movies/Videos/ Film Industry Job Clearinghouse	Dave Kidder Scottsdale	Scottsdale, AZ
TAXACOM	(716)896-7581	Botany, Herbaria, FLORA ONLINE Newsletter, Latin Translation	Clinton Herbarium, Buffalo Museum	Buffalo, NY
Taxonomic Reference File	(215)972-6759	Online Bacterial Name Database - ORACLE Door	BIOSIS Carol Lock/Keith Pittman	Philadelphia, PA
TBBS Net 104/23	(303)699-9248	Home of The Bread Board System (TBBS) BBS Software	Phil Becker/eSoft Inc.	Aurora, CO
Telecommunications Relay Station	(501)442-8777	Online Publications - Excellent TBBS System	Gary Funk	Fayetteville, AR
Telegodzilla	(503)621-3746	Home of ZModem File Transfer Protocol/YModem/YAM	Chuck Forsberg/Omen Technology Incorp.	Portland
Telix Support BBS	(416)284-0682	Support Service for Telix Communications Software	Colin Sampaleanu/Exis Incorporated	West Hill, Ontario
Texas State Law Library BBS	(512)463-1371	Online Legal Periodicals and Citation Database		San Antonio, TX
The Well	(415)332-6106	Very Popular Big BBS - Hourly Charges	Whole Earth Lectronic Link	Sausalito, CA
Thomas Business Systems	(407)395-7057	Used Computer/Peripheral Price List Online Database	Phil Thomas/Thomas Business Systems	
TOPS Support BBS	(415)769-8874	Application Notes, Product Descriptions for TOPS LAN	Sun MicroSystems	Alameda, CA
United Nations BBS	(201)795-0733	UN Press Releases - Unitex News - Unicef	Dr. James Waldron	Hoboken, NJ
US Naval Observatory BBS	(202)653-1079	Time - Date - Sunrise - Sunset - Enter @TCO for Commands	US Department of Commerce US Naval Obser	Washington, D.C.
US Robotics - Sit UBU Sit	(312)982-5092	Support for US Robotics HST 9600 bps Modems	US Robotics Corporation	Skokie, IL
USA Today Distribution Service	(303)973-4222	Distribution Service for USA Today/Newsbytes/Boxoffice	Denver PC Boardwatch Newsletter	Littleton, CO
USNO Time of Day for Clocks	(202)653-0351	Xmits ASCII Time String - Sync Your PC to USNO Atomic Clock	US Dept. of Commerce US Naval Observ.	Washington, D.C.
UT Library Online Catalog	(512)471-9420	Online Library Card Catalog Listing 3.5 million entries	University of Texas at Austin	Austin, TX
VA Property Listing BBS	(602)241-2371	List of VA held property foreclosures	Veterans Admin - Phoenix Regional Office	Phoenix
Vacation Florida Database	(407)839-0333	Florida Tourism Information/Database of Campsites/Hotels	Richard and Barbara Kenney	Orlando, FL
Ward and Randy's CBBS	(312)545-8086	World's First and Oldest Micro-based BBS - Since 2/16/78	Ward Christensen/Randy Suess	Chicago, IL
WeatherBank	(800)827-2727	Online Weather Forecasts for Any City - Download Radar Data	Steve Root/WeatherBrief Data Services	Salt Lake City
WeatherStar Pilot Briefing	(612)296-5426	Pilot Data, Weather, Great Circle Route, Airport Information	Haynes Environmental Systems	Minneapolis, MN
Western Digital Tech Support	(714)756-8176	Hard Drive/Controller Installation and Config Data	Western Digital Corporation	
XyQuest Support BBS	(508)667-5669	Support for XyWrite Word Processor - Custom Keyboard Files	XyQuest Inc. - Christine Madsen	Bellerica, MA

DENVER PC BOARDWATCH

TITLE	PHONE	DESCRIPTION	TYPE	BPS	SOFT	CITY	SYSOP
NBS Automated Computer Time	494-4775	ACTS - Sync PC Clock to NBS Atomic Clock	Custom	1200	Custom	Boulder	Natl. Bureau of Standards
Adelante 104/93	443-8292	Central/Latin America News/Issues	IBM	2400	Opus	Boulder	Zhahai Stewart
Adventures Unlimited 306/156	1-223-4534	Online Games - Chess - Tradewars - More	IBM	2400	QuickBBS	Fort Collins	Ray Randolph
AmNet On-line 306/12	1-223-1297	Animal Rights Issues/Animal Rights Echo	IBM	2400	TBBS	Ft. Collins	James Cherry
Arkham Public Library 104/4B	494-7970	Children's Games	IBM	2400	Opus	Boulder	Neil Beaty
Boulder Amiga Users Group	494-4470	Amiga Support - Over 1000 Amiga Files	IBM	2400	QuickBBS	Boulder	Ken Fricklas
Byte Shop 104/311	794-5065	Jokes/Good Echomail/Downloads	IBM	96HST	QuickBBS	Littleton	Dan O'neal
CAI Denver 104/425	759-0410	Computer Access Support BBS	IBM	96HST	QuickBBS	Denver	John Denny
Camelot 306/18	1-493-4139	Medieval Theme	IBM	2400	QuickBBS	Fort Collins	Ron Gile
Canyonlands BBS 104/116	499-3656	???	IBM	2400	QuickBBS	Moab Utah	Antony Landsman
CBA Information System	329-0159	Continental Basketball Association	IBM	1200	TBBS	Denver	???
OEC Services	393-6715	ANSI True Basic Support Tools	IBM	1200	QuickBBS	Denver	???
Champagne Alley	220-5708	Financial Info - Free Exchange of Info	IBM	2400	RBBS	Denver	Patrick Hinde
Chatfield Armory	972-9023	Firearms for Sale/Trade - Online Games	IBM	2400	QuickBBS	Littleton	Dave Bell
Chidvilas 104/207	449-7399	Bhagwan Shree Rajneesh followers	IBM	96PEP	Opus	Louisville	Terry Mooster
Classifieds Plus/Consumers	794-0491	Consumer Interests/For Sale Items	IBM	1200	RBBS	Littleton	Arnold Peterson
Club Micro 104/88	973-5478	"C"Language/Database/Communication Files	IBM	96HST	Opus	Denver	Don Marquart
CMOS-CO Mtn Operating Systems	322-4078	Amiga/IBM-Utilities-Pictures-Buy/Sell	IBM	96MICROC	QuickBBS	Denver	Kevin Truitt
CO State Judicial BBS 104/420	831-1704	Colorado State Judicial ADP Department	IBM	2400	QuickBBS	Denver	Scott V. Hopta
Colorado Broadcasters 104/42	572-6256	Commercial Radio Frequency Lists	IBM	1200	Opus	Denver	Jeff Brothers
Colorado West BBS	1-241-1966	Grand Junction MUG - Ham/Packet Radio	IBM	96Hayes	PCBoard	Grand Junction	Wayne Hunt
Comm-Post, The 104/666	534-4646	Astronomy -120+ MB of Files - Multiline	IBM	96HSTV32	TBBS	Denver	Brian Bartee
Computer Consulting 104/31B	973-1002	dBase Database Software Developement	IBM	96Hayes	QuickBBS	Littleton	Jim Bucks
Computer Linkage 104/444	499-1022	Amiga/Atari/IBM/TI - Medical Information	IBM	2400	Opus	Boulder	Ron Kuseski
Computer Repeats Inc.	939-8174	Used Atari/Amiga Equipment Sales	IBM	2400	PCBoard	Boulder	Don Whitaker
Control Systems 104/417	458-6248	IBM/Compatibles Subscription Board	IBM	96MICROC	RBBS	Denver	Lupe Ramiriz
Cook, The 104/419	861-0814	Recipes/Cooking Theme 9P-7A	IBM	2400	QuickBBS	Denver	Richard Harper
CP/M SIG INC 104/372	465-1313	Oldest User's Group in Area - CP/M - IBM	IBM	2400	Fido	Broomfield	Al Lundquist
Cyber-Zone, The 104/61	429-2208	Science Fiction/USA Today	IBM	2400	QuickBBS	Littleton	Jonathan Wood
D-Link 1 104/411	936-2791	Golden Micro Computer Sales/Support	IBM	96HST	Opus	Denver	Bob Wells
D-Link III 104/413	935-3577	Down to Earth Level Headed BBS	IBM	2400	QuickBBS	Denver	Mark Haines
Dark Crystal, The 104/421	654-1278	Role Playing Games	IBM	2400	QuickBBS	Denver	Steve Boyd
Data Bank	494-0167	IBM Messages	IBM	2400	TCOMM	Denver	Guido Binetti
Denver Link-UP	1-976-8800	$0.25 per minute Source Code Downloads	IBM	2400	OPUS	Evergreen	Jeffrey Delude
Denver PC Boardwatch 104/555	973-4222	Back Issue Index, Dialing Directories	IBM	2400	TBBS	Littleton	Jack Rickard
Dinosaur Board 104/114	1-652-3595	TRS80 Support/16 Online Adventure Games	IBM	96HSTV32	TBBS	Niwot	Chris Anderson
Dinosaur Egg	680-5985	Graphics Interests	IBM	2400	QuickBBS	Denver	Mick Clark
Eagle's Nest 104/315	933-0701	Contributions to Dumb Friends League	IBM	9600	QuickBBS	Littleton	Ronald Olsen
Education 2000 104/29	449-9807	Education Issues Kindergarten - 12th	IBM	2400	TBBS	Boulder	Roger Salamen
Emerald City BBS 104/214	427-1471	Electronics Discount World	IBM	2400	QuickBBS	Westminster	Daniel Osborn
Equinet	369-0738	Equestrian/Horse Interests	IBM		TBBS	Aurora	Frank Maestas
eSoft Support	699-8222	TBBS Software Support - Hayes/USR Modems	IBM	96HST	TBBS	Aurora	Phil Becker
Estes Park High BBS 104/705	1-586-4131	School Bulletin Board System	IBM	1200	Opus	Estes Park	Joe Lundstrom
Fantasy Mtn D-Link IV 104/803	278-E369	Deaf and Handicapped Issues ASCII TTY	IBM	2400	QuickBBS	Golden	Steve Shockley
Flightstar Information Service	790-4856	Used Aircraft For Sale Database/Bluebook	IBM	2400	Custom	Englewood	Mickey Russell
Foxx Empire 306/16	1-484-4359	Online Simulation of Medieval Town	IBM	2400	QuickBBS	Fort Collins	Andrew Boardman
Fred's BBS	233-1316	Online Chess - Adult Areas	IBM	2400	QuickBBS	Lakewood	Fred Schupner
Free Information Exch. 104/89	699-1516	Programing - Home and Garden	IBM	2400	Opus	Denver	Charles Frnka
Free Thought BBS 104/423	860-9259	Objectivism/Libertarian Views	IBM	96HSTV32	Opus	Denver	Bill Williams

BBS	Phone	Description	Computer	Software	Speed	Location	Sysop
Front Range Online Sys 104/213	466-2296	Home of QKNEWS	IBM	QuickBBS	2400	Broomfield	Gary Jones
Front Range PC Users Group BBS	1-493-4094	Fort Collins Group - Computer Express	IBM	Wildcat	2400	Fort Collins	Tom Oppenheimer
FutureWave BBS 104/57	440-7425	Games / C Language / MIDI 6PM-7AM	IBM	Opus	2400	Boulder	Bruce Arnold
Galaxy Express 999 104/215	469-3221	Japanese Cartoon Animation-Messages	IBM	QuickBBS	2400	Broomfield	Witheld by Request
Gay Community Fido 104/19	795-1215	Messages / Downloads for Homosexuals	IBM	QuickBBS	1200	Littleton	Tom Gettys
GDP Technologies BBS	673-9470	Outstanding IBM Shareware/Programming	IBM	Wildcat	2400	Lafayette	Vincent Ventas
Grotto, The	694-9050	Amiga, Pascal - Ebert Personal Computers	IBM	TBBS	2400	Aurora	Mark Willecke
HP Haven 104/312	671-5976	Tradewars/On-line Games/ 5PM-7:30 AM	IBM	QuickBBS	2400	Westminster	Kris White
In To The Night 104/31	659-1897	IBM Game Files 9PM-7AM	IBM	Opus	1200	Fort Lupton	Jim Vorheis
Intermittent Connection 104/60	797-0296	General Messages/Download	IBM	QuickBBS	96HST	Littleton	Ron Dries
JEFFCOM BBS	273-6951	Jefferson County Public Schools	IBM	RBBS	1200	Golden	Brett Dodds
K.A.O.S 306/19	1-226-5654	Get Smart	IBM	QuickBBS	2400	Fort Collins	John Anderson
KDKO Radio 104/64	293-8462	Broadcasting Theme	IBM	TBBS	2400	Littleton	Jim Burt
King's Market Bookshop 104/115	665-6091	Books, Writers, On-line Adventure Games	IBM	TBBS	2400	Boulder	Larry Scheideman
Lakewood Department of Safety	987-7388	Police Sponsored - Law Enforcement Msgs	IBM	RBBS	1200	Wheatridge	Greg Bradt
Lensman, The	979-8953	Science Fiction/Fantasy Fandom News/Info	IBM	GT Power	2400	Littleton	Harold "Monty" Montrose
Lodge, The 104/212	420-0305	Arvada Quick BBS Board	IBM	QuickBBS	2400	Arvada	Ken Zen
MACE 104/416	797-8090	Metro Area Computer Enthusiasts	IBM	QuickBBS	1200	Denver	???
Manville Info Services 104/978	978-3946	Business Software / Apple Macintosh	IBM	Fido	1200	Littleton	US Department of Commerce
MASC Library	497-5848	PC SIG CD ROM Online 4:30PM-7AM Only	IBM	RBBS	2400	Boulder	Tony Ferris
Metamorphasis	1-772-7229	Small Minihost System	IBM	Minihost	2400	Lafayette	Kirk Stevens
Metronet BBS	985-4652	Business Network - $25 for six months	IBM	TBBS	2400	Lakewood	Girard Westerberg
Microlink B 104/108	972-9600	1 Gigabyte Files - USA Today - Multiline	IBM	TBBS	96HSTV32	Littleton	???
Microlink D 104/711	237-8575	Over 200 MB - Doesn't Break	IBM	TBBS	96HST	Lakewood	Paul Smith
Microlink Minus Two 104/204	369-5734	Professional Comp. Sales Inc./Astronomy	IBM	QuickBBS	2400	Denver	Daniel Segard
Midrash 104/18	289-6864	Messianic Judaism - Religious/Philosophy	IBM	QuickBBS	2400	Denver	Bill Ankele
Mile High BBS	733-1340	Triathalons - Race Schedules - Fitness	IBM	RBBS	2400	Denver	Dave Miller
Mile High Net	671-7308	Fido Board	IBM	Fido	2400	Aurora	Claude Warren
Mohave Net Gateway 104/62	426-0623	Science Fiction/Medical Echo	IBM	QuickBBS	96HST	Denver	Bill Watts
NetComm BBS	790-8349	Weather - Online Games - 110 MB	IBM	GT Power	2400	Littleton	Hal/Fran Piser
New Age Bulletin Board, The	366-1106	Health, Ecology, Philosophy	IBM	TBBS	1200	Aurora	Marcel Madonna
NightFlyer 104/210	467-9199	Basic/dBase/Assembler/C Programming	IBM	QuickBBS	2400	Arvada	Larry McNeill
Nurse Link 104/52	270-4936	UCHSC School of Nursing	IBM	TBBS	2400	Littleton	Onnig Kouyoumdjian
OKY BBS 104/113	494-0533	Armenian Electronics Consultant	IBM	QuickBBS	2400	Boulder	Lee Lasson
On-Line Consulting 104/45	449-5251	Consultant Directory/Desktop Publishing	IBM	Opus	2400	Estes Park	Pete Dempsey
On-Line Shopping Service	442-5125	Boulder Home Grocery Delivery $5 + 5%	IBM	Chairman	1200	Boulder	Claude Warren
P2B2 S 104/51	329-3337	Public Psychiatry / AI Themes 6PM-8AM	IBM	QuickBBS	2400	Denver	Mark Owens/Mike Corbin
Paranet Omega 104/422	431-1343	Paranormal/Religion/UFO/Oddities	IBM	QuickBBS	96HST	Wheatridge	Phil Kaiser
PCIS 104/904	789-4610	PC Info Services - List of User Groups	IBM	Opus	2400	Englewood	Chris Anderson
Pentax Support	460-1637	CD WORM/Flatbed Scanner/Fanfold Laser	IBM	TBBS	1200	Broomfield	Larry Kayser
Phoenix TBBS 104/739	841-9570	Multiline - INFOMAT - Chat areas	IBM	TBBS	96HST	Parker	Craig Baker
Pinecliffe 104/28	444-7073	170 Meg - Online Order for CDB Systems	IBM	Opus	96HST	Boulder	Cathy Nicolleti
Pink Flamingo 104/607	497-3934	Previousely Fido NBS	IBM	QuickBBS	2400	Boulder	John Bilbro
Priority Business Sys. 104/41	771-8107	PC Magazine/Tech Journal Files	IBM	Opus	2400	Littleton	Bob Voorhees
Professional System, The	740-2223	Writers, Lawyers, EDP Auditors	IBM	TBBS	1200	Littleton	???
Quest, The	429-4617	Online Chess/Tradewars/Empire/Trivia	IBM	QuickBBS	2400	Denver	Adam Hudson
Quick BBS Support Board 104/24	423-3114	Home of Quick BBS Software	IBM	QuickBBS	2400	Arvada	
R.A.B.B.I.T.	757-9509	Colorado Highway Department - Planning	IBM	TBBS	1200	Denver	Colorado Dept. Highways
Reading Room, The 104/513	690-5410	6PM - 6AM Ringback System during day	IBM	RBBS	2400	Aurora	Don Bell
Ready Room, The 104/424	329-8136	Star Trek Theme - USS Tutakai NCC-1799-B	IBM	QuickBBS	2400	Denver	Jason Steck
Realtime Control & Forth Board	278-0364	Vesta Technology/Denver Forth Int. Group	IBM	PCBoard	2400	Wheatridge	Jack Woehr
Regency Datasource 104/58	972-1222	Private Computer Consulting Support	IBM	Opus	96Hayes	Littleton	Charlie Bass
RiBBS Support Hdqrts. 104/54	343-6707	Support for CoCo RIBBS Software	IBM	QuickBBS	2400	Aurora	Ron Bihler
Rocky Mountain RBBS	750-2107	INFO NEEDED	IBM	RBBS	1200	Aurora	Steve Kornreich

DENVER PC BOARDWATCH

LIST OF AREA CODE 303 ELECTRONIC BULLETIN BOARD SYSTEMS AND ON-LINE INFORMATION SERVICES - SEPTEMBER 1989

TITLE	PHONE	DESCRIPTION	TYPE	BPS	SOFT	CITY	SYSOP
Short Line 104/36	778-7312	Varied Topics, Fidonet, BinkleyTerm	IBM	2400	Opus	Lakewood	Alan Applegate
SnarfQuest V 104/317	973-0625	The Tower	IBM	2400	QuickBBS	Littleton	Radford Walker
SnarfQuest VI - The Mirage	933-2870	Online Games - 120 MB of Downloads	IBM	2400	Phoenix	Littleton	Jon McDonald
SnarfQuest III 104/209	469-0125	The TALL Snarf Messages-Games GCQ	IBM	96HSTV32	QuickBBS	Broomfield	Elliott Mosher
SnarfQuest|| 104/46	761-1634	The Arena On-line Games, Fantasy, AD&D	IBM	96HST	QuickBBS	Englewood	Dax Davis
Sound Doctrine BBS 104/514	680-7209	Christian BBS / Sound Doctrine Church	IBM	2400	TBBS	Aurora	Tim Williams
Space Environment Service Cntr	497-5000	NOAA Solar Flare Forecast / Advisory	IBM	1200	PBBS	Boulder	US Dept of Commerce
Space Network	494-8446	Space Exploration Information	IBM	2400	TBBS	Boulder	Tom Meyer
Squirrel's Nest	1-242-7977	Grand Junction BBS	IBM	2400	PCBoard	Grand Junction	Allan Worley
Steamboat Information	1-879-6741	Info on Steamboat Springs Area	IBM	1200	TBBS	Steamboat Springs	???
Stone Wall 104/112	499-2676	Online Games/Graphics 120 MB	IBM	96HST	QuickBBS	Boulder	Mike Reetz
Summit TBBS 104/47	1-468-2749	Ski Information	IBM	96HST	TBBS	Dillon	Lawrence Kehl
TBBS Net 104/23	699-9248	The B]read B]oard S]ystem Support	IBM	2400	TBBS	Aurora	Phil Becker/eSoft Inc.
Terus Public BBS 104/43	469-7161	MINDS AI TextBase Indexer Support	IBM	96HST	Opus	Broomfield	Todd Hill
Terus RegUser 104/44	341-1404	MINDS Online Textbase - USA TODAY	IBM	96HST	Opus	Aurora	Bart Henthorn
The 8th Sea 104/610	252-9235	Fidonet 104 Net Coordinator	IBM	2400	QuickBBS	Northglenn	Rod Lamping
Translations Unlimited	988-5765	Language Translation 6PM-6AM	IBM	2400	Minihost	Lakewood	Jon Johnson
Twin Peaks PCBoard	1-651-0225	On-line Games	IBM	2400	PCBoard	Longmont	Ken Krueger
Vet Set, The	690-3218	Veterans Issues - Colorado Lottery Data	IBM	2400	RyanBBS	Aurora	Alfred Petersen
Watchdesk, The 104/66	450-0822	Safety - Arson - Hazardous Material	IBM	96HST	QuickBBS	Thornton	Emit Hurdelbrink
Waterton RBBS	977-7353	Martin Marietta; Employees Only	IBM	2400	RBBS	Denver	Ken Beaudrie
Weyr, The 104/211	429-2975	Good Collection of Game Software	IBM	96HST	Opus	Westminster	Ken Shimko
Wizardry 104/630	670-1416	Fantastic Online Blackjack/Casino Games	IBM	96HST	QuickBBS	Evergreen	Marvin Cook
World Peace BBS 104/415	320-4822	Current Events, Politics, Religion	IBM	2400	QuickBBS	Denver	Bucky Carr
YUCCA Mountain Project Group	236-9812	US Bureau of Reclamation - Dept of Int.	IBM	12-19200	PCBoard		Mark Pabst
C.A.R.L. Denver	830-0519	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.A.R.L. Denver	830-1165	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.A.R.L. Denver	830-1546	Colorado Alliance of Research Libraries	Tandem	1200	Custom	Denver	N/A
C.A.R.L. Denver	830-1547	Colorado Alliance of Research Libraries	Tandem	1200	Custom	Denver	N/A
C.A.R.L. Denver	830-1548	Colorado Alliance of Research Libraries	Tandem	1200	Custom	Denver	N/A
C.A.R.L. Denver	830-2199	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.A.R.L. Denver	830-2241	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.A.R.L. Denver	830-2265	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.A.R.L. Denver	830-2297	Colorado Alliance of Research Libraries	Tandem	2400	Custom	Denver	N/A
C.D. Players	825-0419	Computer Discount On-line Store/Amiga	Amiga	2400	TBBS	Denver	Jay Tompkins
Arvada 68K BBS	469-9862	Amiga/Macintosh/Atari ST/Motorola 68000	Amiga1000	2400	BBS-PC	Denver	Reid Bishop
Greenline	650-1509	Amiga Messages and Downloads	Amiga1000	2400	BBS-PC	Broomfield	Phil Green
Ninth Portal, The	690-5001	SciFi/Fantasy Starship Exploration Game	Amiga2000	2400	Atredes	Fort Collins	Rick Henderson
Outer Limits BBS, The	1-484-1699	Amiga System Emulating IBM-XT	Amiga2000	2400	QuickBBS		Gary Whicker
Aces High	366-8159	Apple Programming/Messages	Apple	2400	GBBS	Aurora	Jeff & Steve Brothers
APSNet	693-6737	Aurora Public Schools Network	Apple	2400	GBBS	Aurora	Columbia Middle School
Box's Cabin, The	424-9185	Apple / Technical Notes	Apple	2400	Protree	Arvada	Kent Roberts
C.A.C.H.E	745-4960	CO Apple & Compatible Home Enthusiasts	Apple	2400	GBBS	Denver	Gary Edwards
City Morgue, The	442-8498	Necromaniacal Fixation With Stiff Bodies	Apple	2400	GBBS	Boulder	???
Denver Deaf-Net	989-9245	Hearing Impaired/Computing	Apple	1200	Protree	Lakewood	David Sheneman
Enterprise	377-1005	Local Radio Freq List - Star Trek Theme	Apple	2400	Protree	Denver	Jeff Tensly
Funny Farm	989-0915	Apple Only BBS	Apple	2400	???	Lakewood	???
Genesis Project	287-8267	Apple II General	Apple	2400	Protree	Commerce City	Gene Humbert
Greeley-Com-Net	1-351-8861	Modem Users Board	Apple	2400	GBBS	Greeley	Lowell Shatraw

BBS Name	Phone	Description	Computer	Baud	Software	City	SysOp
L&L Support	420-3568	Primary GBBS Pro Software Support BBS	Apple	2400	GBBS	Arvada	Lance Taylor-Warren
Laboratory BBS/SUPERTAC	287-5274	Commodore with Laboratory Theme	Apple	.96HST	GBBS	Denver	Professor Beaker
Land of Lindon	987-2094	Fantasy Runequest Games	Apple	1200	AlphaIII	Lakewood	???
LES-COM-net	526-2046	Lesley College Comm Net - GBBS Multiline	Apple	2400	GBBS	Genesee	George Willett
Mom's BBS	690-4913	General Message/Socializing	Apple	2400	Protree	???	Margarite ???
Bavarian's Gausthaus	367-5877	New Atari BBS Software System	Atari	1200	Express	Aurora	Bavarian
Four Wheeling BBS, The	469-4954	Jeeping / Camping / Outdoors	Atari	2400	STadel	Broomfield	John Ferguson
Generic BBS	1-857-6881	Titanic Historical Society Information	Atari	1200	BBS Exp	Fort Lupton	L.A. Sneeringer
Hozerville	985-9760	Atari 130 with 53 MB of files	Atari	2400	TODAMIS	Denver	Jacey Squires
Mile High Forem #5	431-1404	Outstanding Atari ST Database - HST 9600	Atari	.96HST	Forem	Arvada	???
Mycroft	777-8898	Horizon Computer/National Atari BBS List	Atari	1200	TODAMIS	Denver	Phil Michaelson
Ron and Shannons BBS	978-0298	Atari Support 5.4 MB XE 130	Atari	2400	OASIS	Englewood	Ron/Shannon Sellers
Skyline Computers	457-0320	Atari ST Support, Files, etc.	Atari	2400	Forem	Denver	Dave Lloyd
Cricket's Hollow	499-9828	Commodore BBS	C-128	1200	C-Net	Denver	Cricket
Phasar	745-4305	Teen Conversation - Advice Column	C-128	1200	C-Net	Aurora	Roy Rush
Regimental Headquarters	375-9556	Commodore - Military Theme	C-128	1200	C-Net	Denver	Bob Greear
Acme Detective Agency	933-2377	Profanity Allowed	C-64	1200	Visions		Snake-Eyes
Albuquerque Starport	279-4655	Commodore Network Systems International	C-64	1200	C-Net	Golden	Greystoke Mindmaster
Gridiron, The	797-6003	Football Theme	C-64	1200	ImageBBS		
Mailbox BBS	421-8050	Ham Radio/Sports/Swap/Adult Jokes	C-64	300	C-Net	Westminster	Richard Miller
Pit Stop, The	364-3927	Auto Racing Theme	C-64	1200	C-Net		The Rascal
Pyroland	745-5213	Pyromania - Burning Things.	C-64	300	TelExcel	Lakewood	Pyro Pete
Realm, The	937-0215	Royal Theme - Complete with King	C-64	1200	C-Net	Denver	Bob Hennessy
Seven-Eleven	699-7603	Commodore 64 system	C-64	1200	NewImage	Denver	Hack Man
Vern's Terminal Exchange	433-1150	Commodore Messages/Downloads/Ads	C-64	1200	Ivory	Denver	???
Computer Know How	279-0224	Hard Disk Installation / Tech Support	CP/M	1200	ZBYE	Golden	John Holmgren
KCNC Storm Center 4 Weather	839-1188	National Weather Service Digital Radar	DEC VAX	1200	Custom	Denver	KCNC TV
Mile High Epson User Group BBS	752-2943	MHEUG Club Board	EPSON	2400	TBBS	Aurora	Dale Bucknam
HP-BBS 306/10	1-229-9719	Jokes, Amazing but True stories,	HP-Vectra	9600	TBBS	Fort Collins	Rob Diehl
LaserWriting Desktop Service	741-4122	Laser Printing/Scanning/Linotronic 300	MAC	1200	RedRyder	Denver	Bill Wright
Mile High Mac Meet	758-9159	Denver Macintosh Users Group	MAC	.96HST	WWIV	Denver	Jon Taylor
MLM International Networks	933-2654	Online Mall - TANDY Computers - MCI Tel.	MAC	1200	MouseEx	Littleton	Michael Mckizzic
Publishing Resources Inc.	442-2011	Laser Printing/Publishing/Linotronic	MAC	1200	RedRyder	Littleton	???
Fort Mac 306/17	**1-221-9450**	**Macintosh**	**Macintosh**	**2400**	**?**	**Fort Collins**	**Greg Shaw**
Radscan	1-675-3225	Rangely PDP11 BBS Multiline - Games	PDP-11/45	1200	RSTS9.4	Rangely	John Henderson
Radscan	1-675-3326	Password RADSCAN -	PDP-11/45	1200	RSTS9.4	Rangely	John Henderson
Boulder Public Library System	444-2057	Library Research	Tandem	1200	Custom	Boulder	Eyring Research institute
Boulder Public Library System	444-2074	On-Line Card Catalog - Member C.A.R.L	Tandem	1200	Custom	Boulder	Eyring Research
Kings Bench 104/615	377-6725	Compatible Computer Info Exchange	TANDY1000	2400	Fido	Denver	Ralph Allison
College Board, The	979-7299	Space Wars Game	Tandy2000	300	???	Littleton	Tom Nielson
Mountain Man TI	797-6783	Denver TI Users Group - Texas Instrument	TI	2400	Tigger	Littleton	Roy Bartee
Niteline PBBS	277-1447	Texas Instruments - Lists 193 TI BBS	TI 99/4A	2400	Paradigm	Golden	Keith Amann
Controller Board/TBBS Island	690-9423	Computer Supplies - Online Sales	TRS	1200	TBBS	Aurora	Mike Hastings
Crossroads	499-0457	Discussion	TRS	2400	TBBS	Lakewood	Mark Bradford
Photo Tech	781-1079	TRS 80 / HAM / Video / Camera	TRS	2400	TBBS	Englewood	Jim Gerritz
PSINet	985-2634	Parapsychology / Near Death Experiences	TRS	1200	TBBS	Denver	William Tedder
Terra Main	830-8098	TRS80 Model 4 Support-Messages-SciFi	TRS80 4	1200	Tandy Tr	Denver	Barry Hunsicker/Capt.Kirk
Alpha BES/Intercomex	367-1935	Enter ALPHA- Ham Radio/Space Topics	Unix Mini	1200	UNaXcess	Denver	Cyro Lord/Robert Brumley
Temple of Doom	771-9523	INFO NEEDED	unknown	1200	???	Englewood	???
GLOBAL Information	286-7914	Fee Subscription / Software Database	VAX	2400	Custom	Denver	Jim Comstock
USGS Quick Epicenter Determ.	279-6374	Earthquake Data CLASS:NEIS USER:QED	VAX	300 7E2	????	????	Bruce Presgrave

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IN THIS ISSUE